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(54) SPORTS CHARTING SYSTEM

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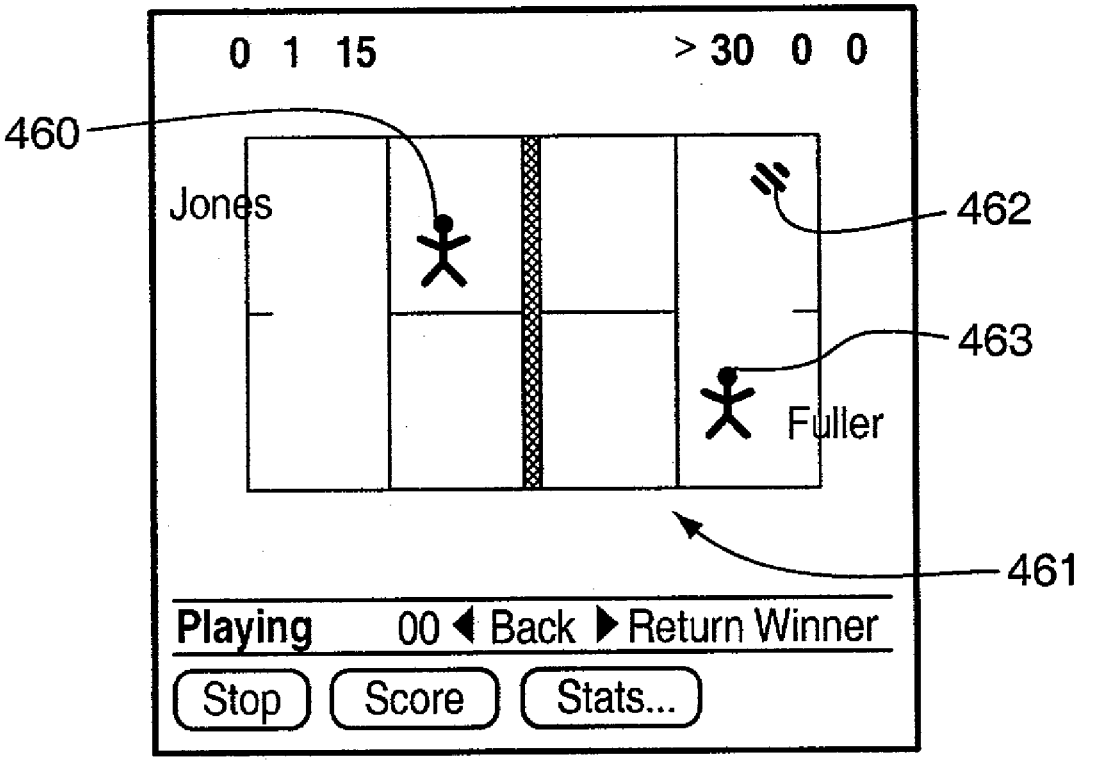
(52) **U.S. Cl.** **700/91**

(57) **ABSTRACT**

The sports charting system operates on standard portable and non-portable electronic processing devices. The sports charting system stores and displays a sport environment and stores and accepts user data input relating to statistics and player and sport apparatus positions relative to the sport environment. The sports charting system then generates real-time statistics from the user inputted player and sport apparatus positions. Tactical information and practice drills are derived from the stored real-time statistics and displayed to the user to communicate the tactical and mechanical strengths and weaknesses of a player.



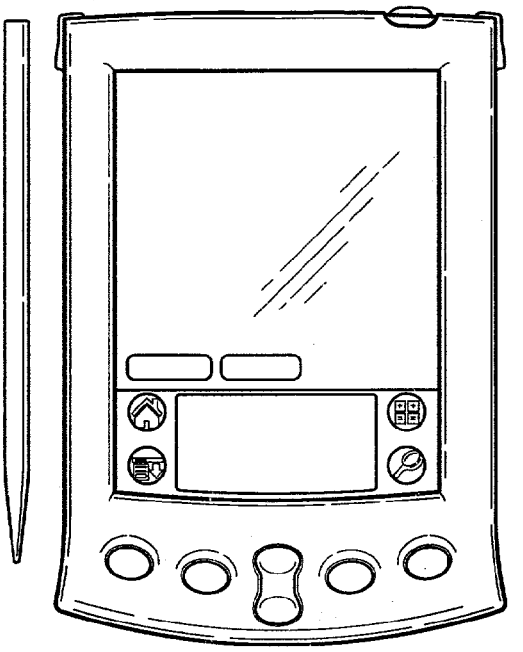


FIG. 1A

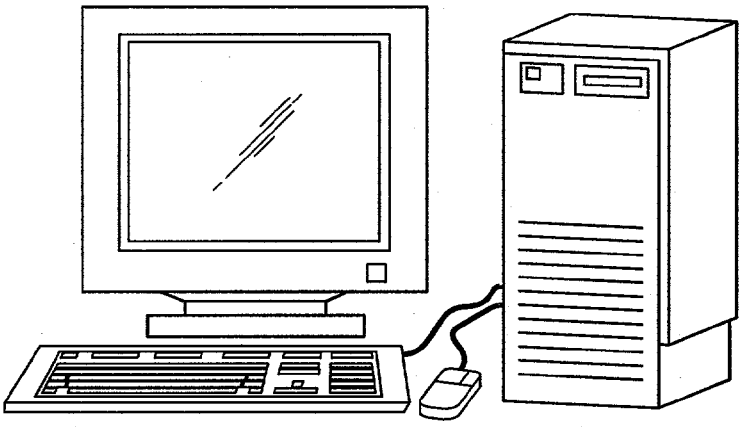


FIG. 1B

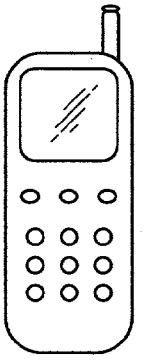


FIG. 1C

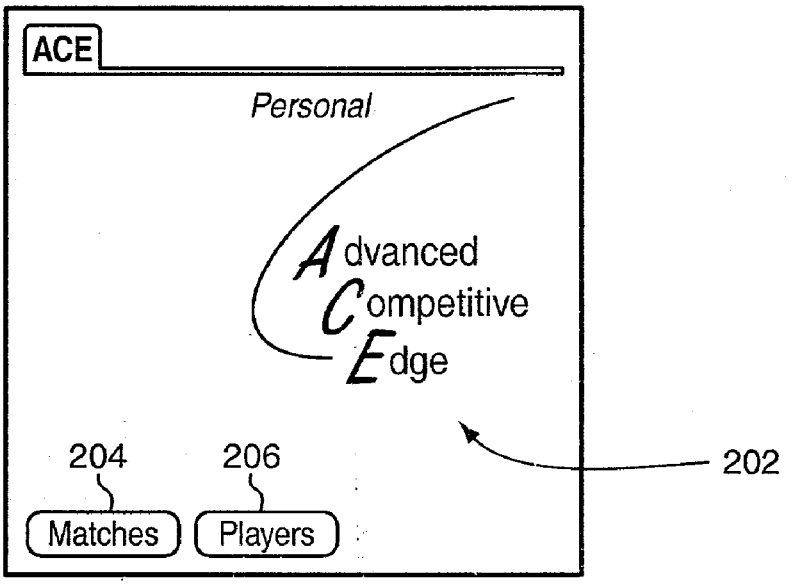

ACE
Personal
Advanced
Competitive
Edge
204
206
202
Matches
Players

FIG. 2

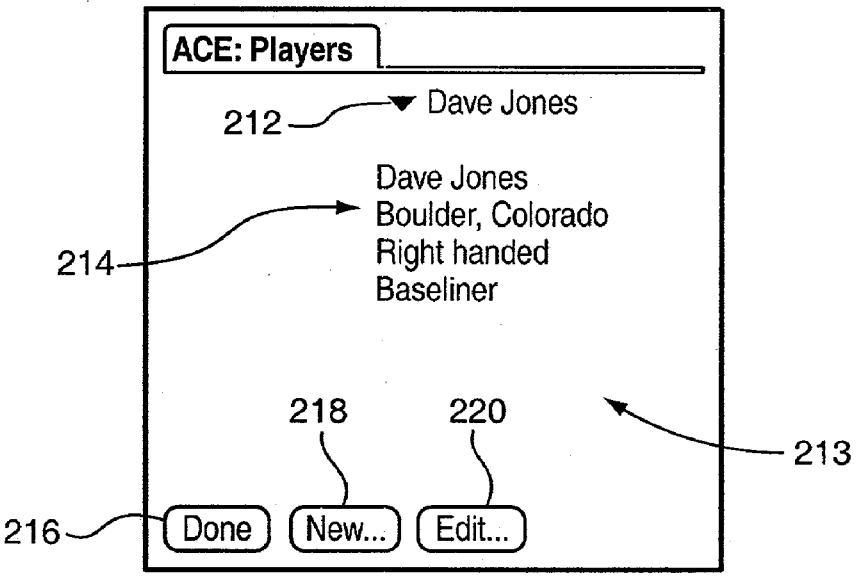

ACE: Players
212
Dave Jones
Dave Jones
Boulder, Colorado
Right handed
Baseliner
214
218
220
213
216
Done
New...
Edit...

FIG. 3

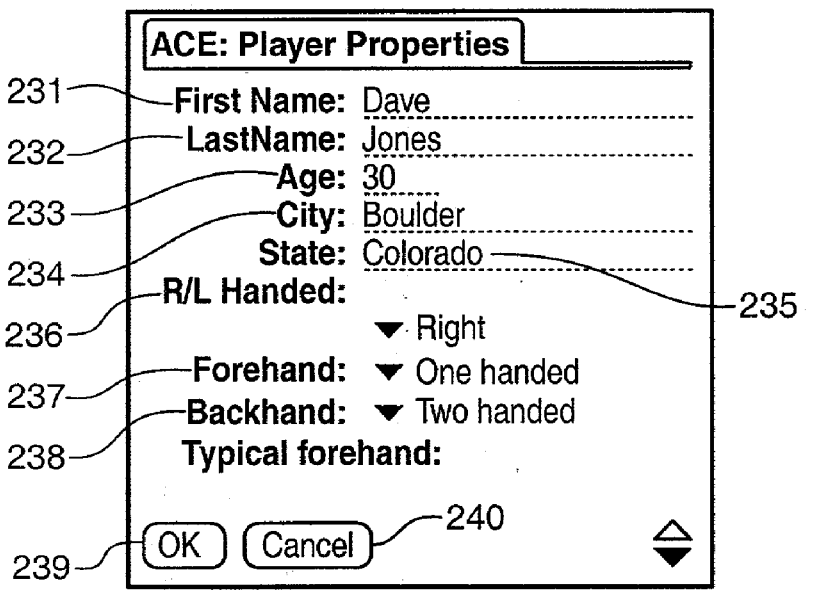

ACE: Player Properties
231
First Name: Dave
232
LastName: Jones
233
Age: 30
234
City: Boulder
State: Colorado
235
236
R/L Handed:
Right
237
Forehand: One handed
238
Backhand: Two handed
Typical forehand:
239
OK
Cancel
240

FIG. 4

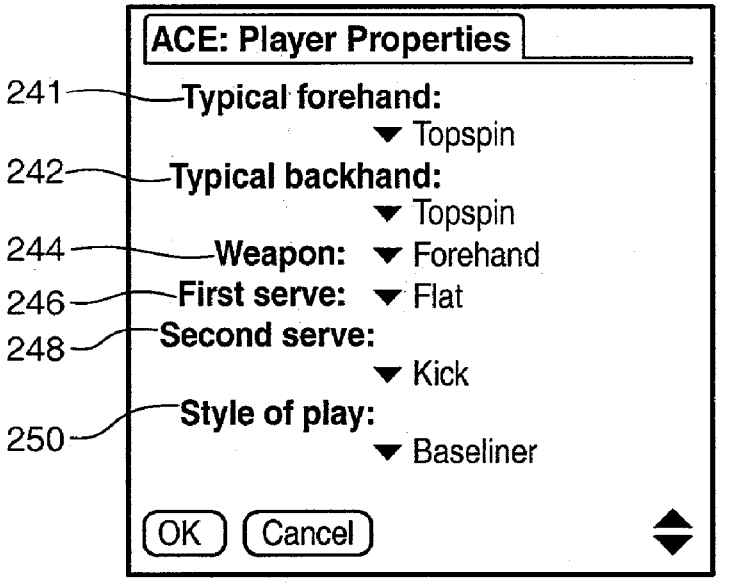

ACE: Player Properties
241
Typical forehand:
Topspin
242
Typical backhand:
Topspin
244
Weapon: Forehand
246
First serve: Flat
248
Second serve:
Kick
250
Style of play:
Baseliner
OK
Cancel

FIG. 5

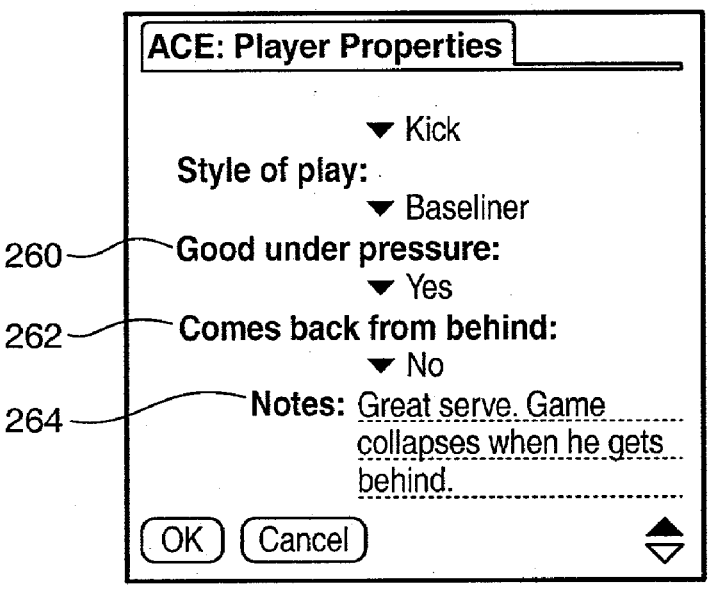

ACE: Player Properties
Kick
Style of play:
Baseliner
260
Good under pressure:
Yes
262
Comes back from behind:
No
264
Notes: Great serve. Game collapses when he gets behind.
OK
Cancel

FIG. 6

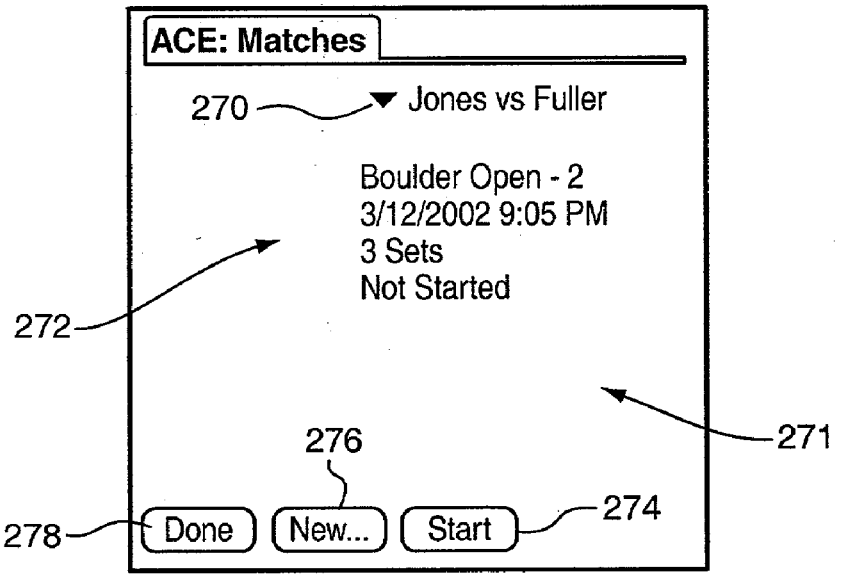

ACE: Matches
270
Jones vs Fuller
Boulder Open - 2
3/12/2002 9:05 PM
3 Sets
Not Started
272
271
276
278
Done
New...
Start
274

FIG. 7

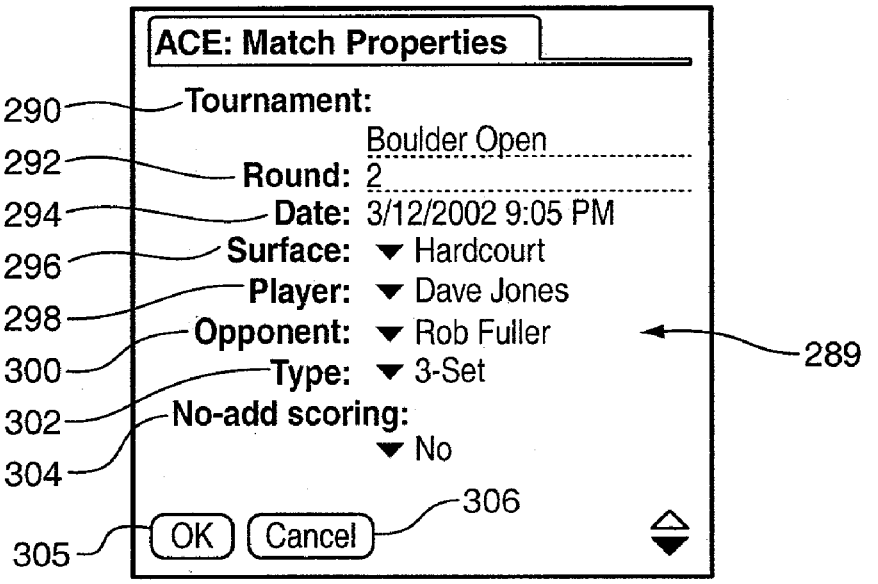

ACE: Match Properties
290
Tournament:
Boulder Open
292
Round: 2
294
Date: 3/12/2002 9:05 PM
296
Surface: Hardcourt
298
Player: Dave Jones
300
Opponent: Rob Fuller
289
302
Type: 3-Set
304
No-add scoring:
No
306
305
OK
Cancel

FIG. 8

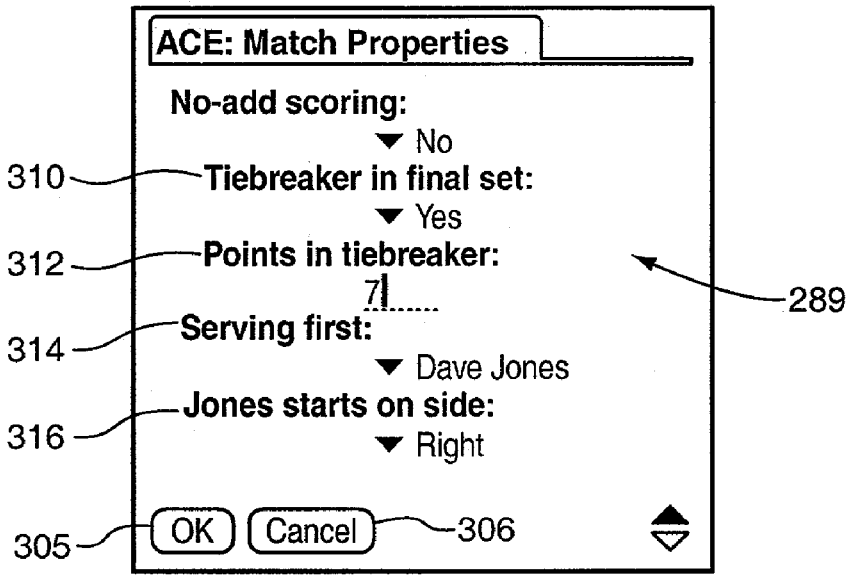

ACE: Match Properties
No-add scoring:
No
310
Tiebreaker in final set:
Yes
312
Points in tiebreaker:
7
289
314
Serving first:
Dave Jones
316
Jones starts on side:
Right
305
OK
Cancel
306

FIG. 9

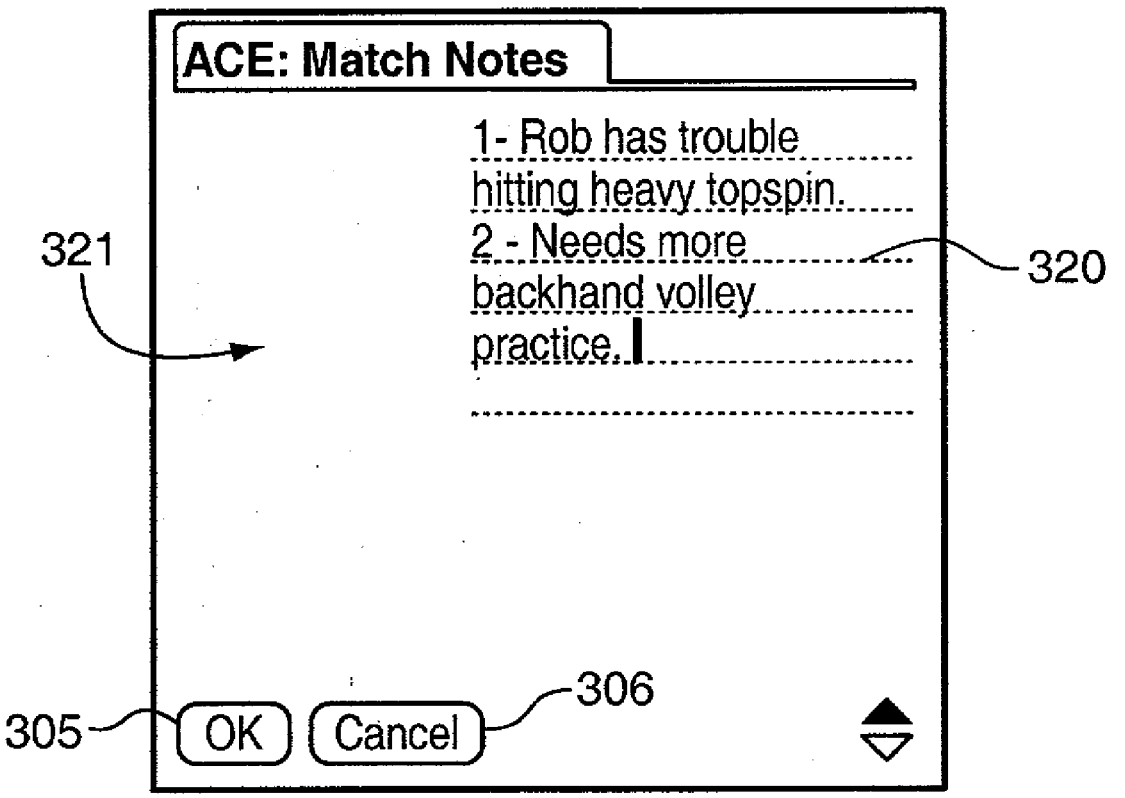

ACE: Match Notes
1- Rob has trouble
hitting heavy topspin.
2 - Needs more
backhand volley
practice.
321
320
305
OK
Cancel
306

FIG. 10

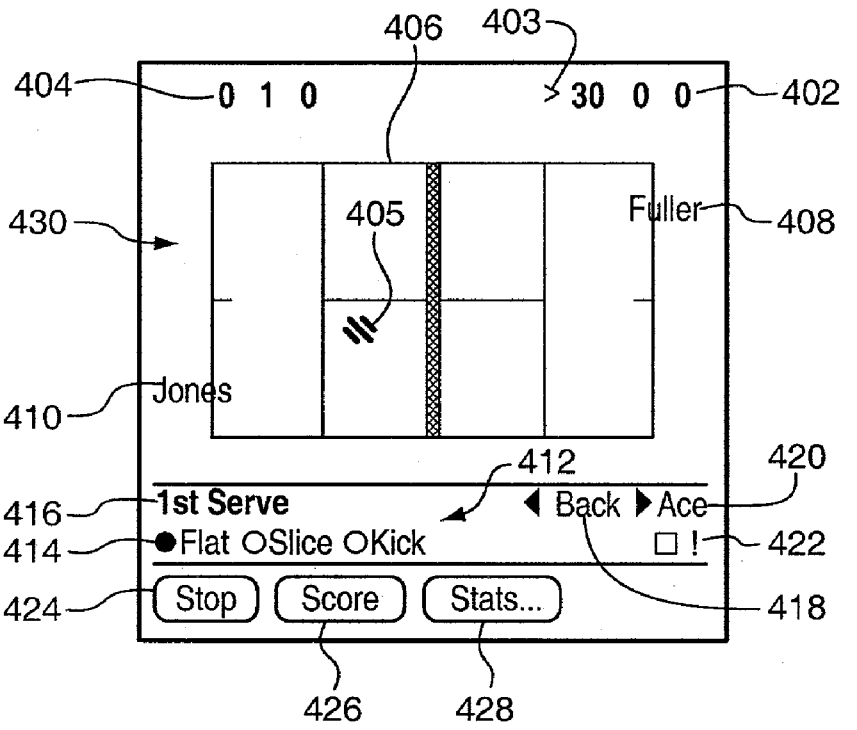

406
403
404
0 1 0
> 30 0 0
402
430
405
Fuller
408
410
Jones
412
420
416
1st Serve
Back Ace
414
Flat Slice Kick
422
424
Stop
Score
Stats...
418
426
428

FIG. 11

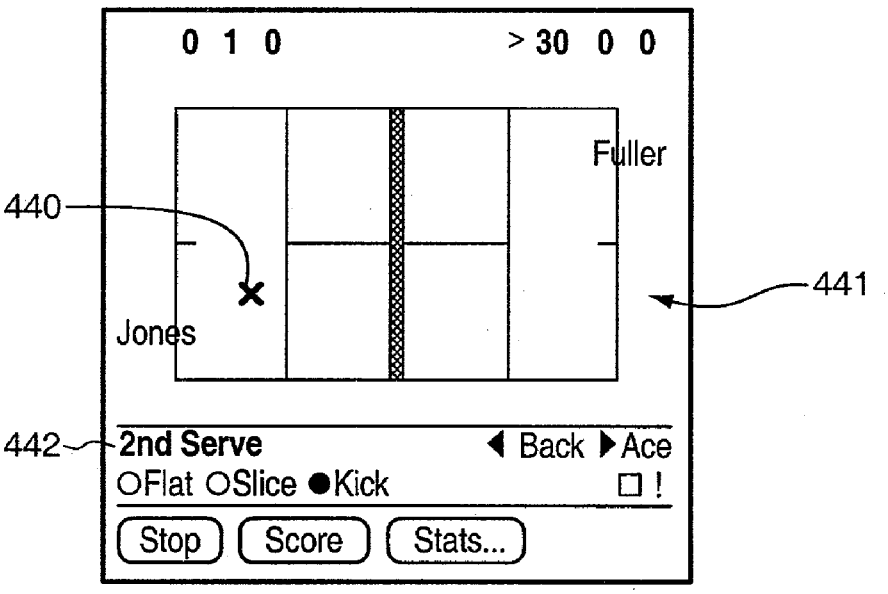

0 1 0
> 30 0 0
Fuller
440
441
Jones
442
2nd Serve
Back Ace
Flat Slice Kick
Stop
Score
Stats...

FIG. 12

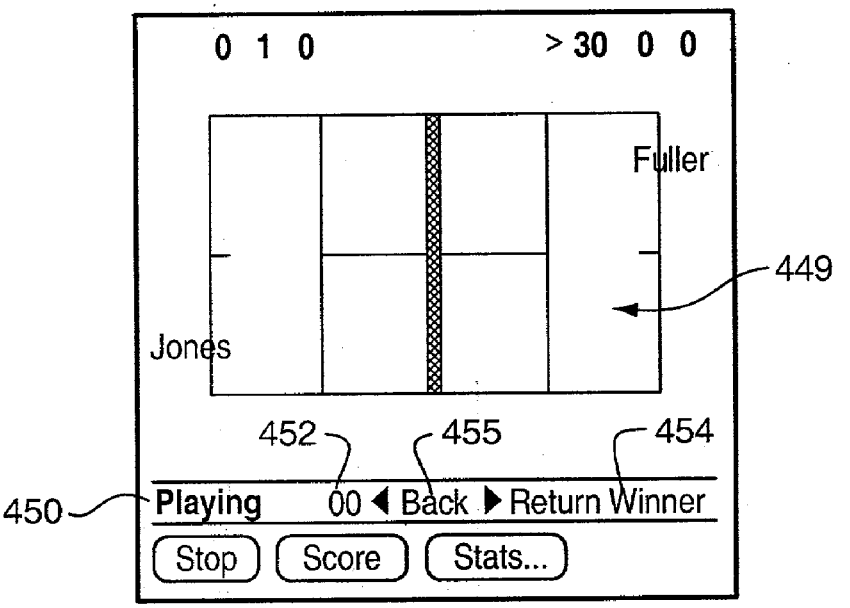

0 1 0
> 30 0 0
Fuller
449
Jones
452
455
454
450
Playing
00
Back
Return Winner
Stop
Score
Stats...

FIG. 13

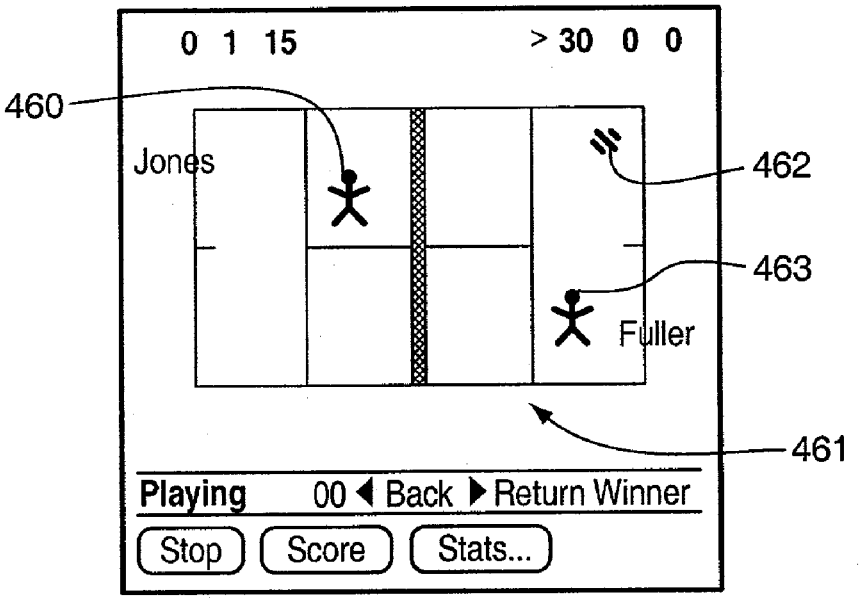

0 1 15
> 30 0 0
460
Jones
462
463
Fuller
461
Playing
00
Back
Return Winner
Stop
Score
Stats...

FIG. 14

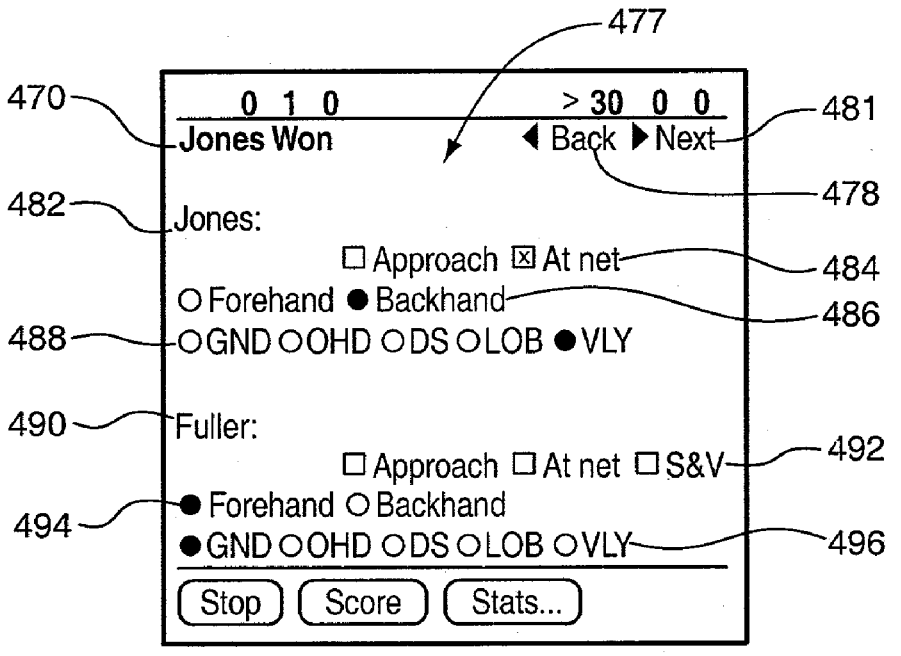

477
470
0 1 0
> 30 0 0
481
Jones Won
Back Next
478
482
Jones:
Approach At net
484
Forehand Backhand
486
488
GND OHD DS LOB VLY
490
Fuller:
Approach At net S&V
492
494
Forehand Backhand
GND OHD DS LOB VLY
496
Stop
Score
Stats...

FIG. 15

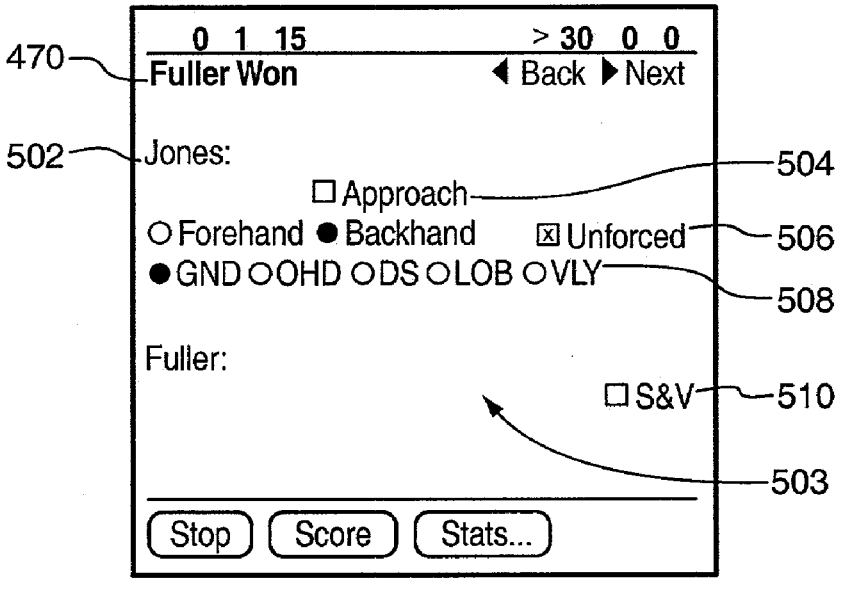

470
0 1 15
> 30 0 0
Fuller Won
Back Next
502
Jones:
504
Approach
Forehand Backhand
Unforced
506
GND OHD DS LOB VLY
508
Fuller:
S&V
510
503
Stop
Score
Stats...

FIG. 16

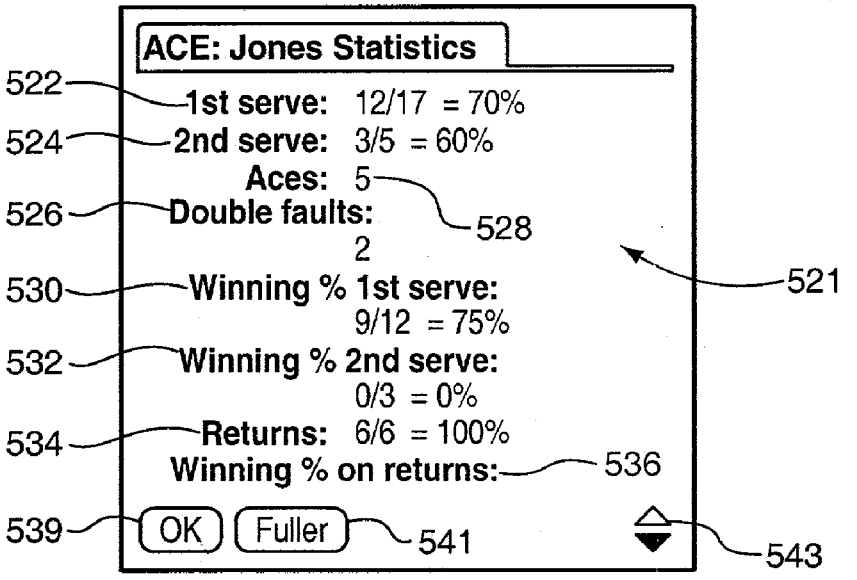

ACE: Jones Statistics
522
1st serve: 12/17 = 70%
524
2nd serve: 3/5 = 60%
Aces: 5
526
Double faults:
528
2
530
Winning % 1st serve:
9/12 = 75%
532
Winning % 2nd serve:
0/3 = 0%
534
Returns: 6/6 = 100%
Winning % on returns:
536
539
OK
Fuller
541
543
521

FIG. 17

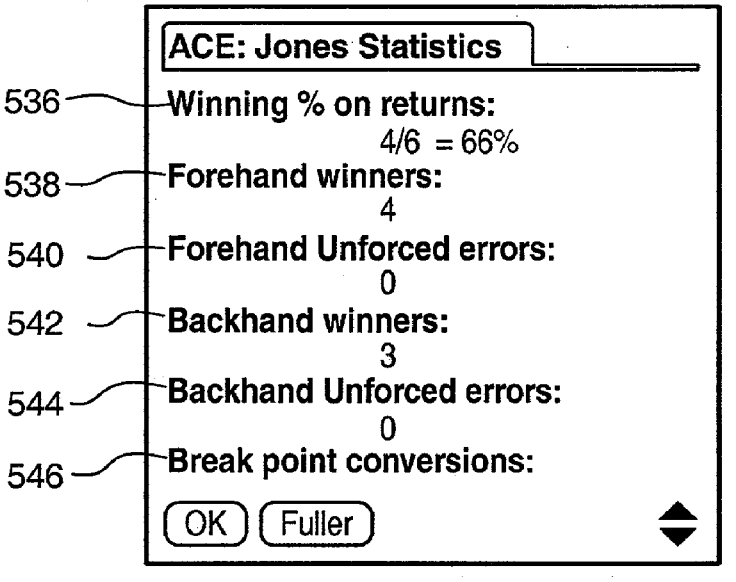

ACE: Jones Statistics
536
Winning % on returns:
4/6 = 66%
538
Forehand winners:
4
540
Forehand Unforced errors:
0
542
Backhand winners:
3
544
Backhand Unforced errors:
0
546
Break point conversions:
OK
Fuller

FIG. 18

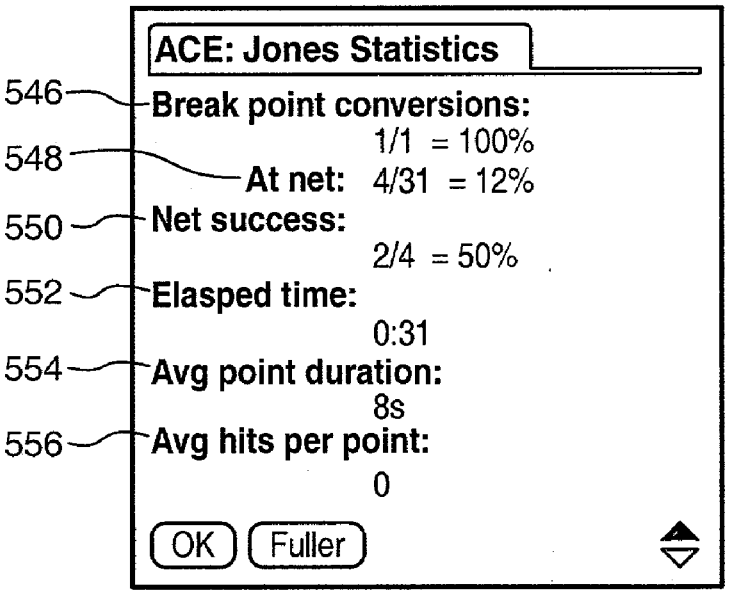

ACE: Jones Statistics
546
Break point conversions:
1/1 = 100%
548
At net: 4/31 = 12%
550
Net success:
2/4 = 50%
552
Elasped time:
0:31
554
Avg point duration:
8s
556
Avg hits per point:
0
OK
Fuller

FIG. 19

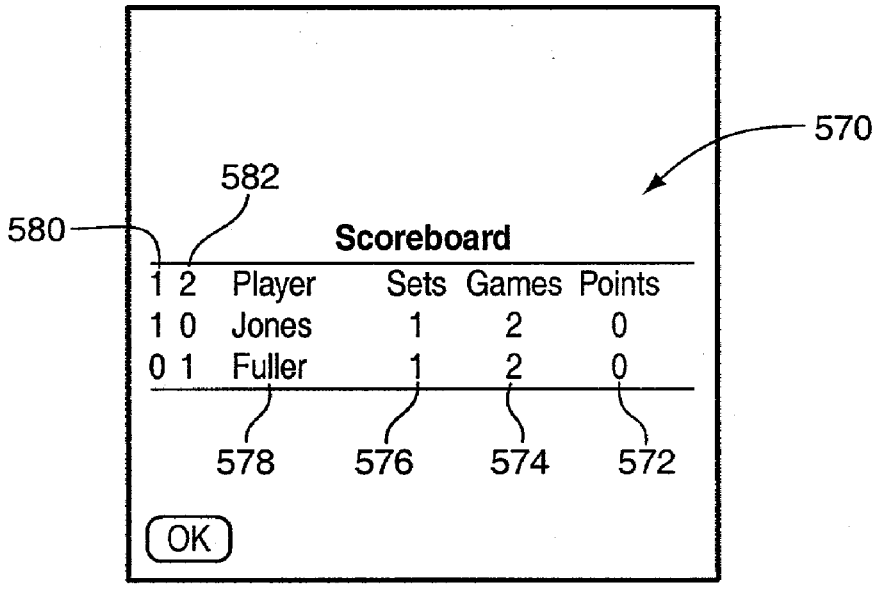

570
582
580
Scoreboard
1 2 Player Sets Games Points
1 0 Jones 1 2 0
0 1 Fuller 1 2 0
578
576
574
572
OK

FIG. 20

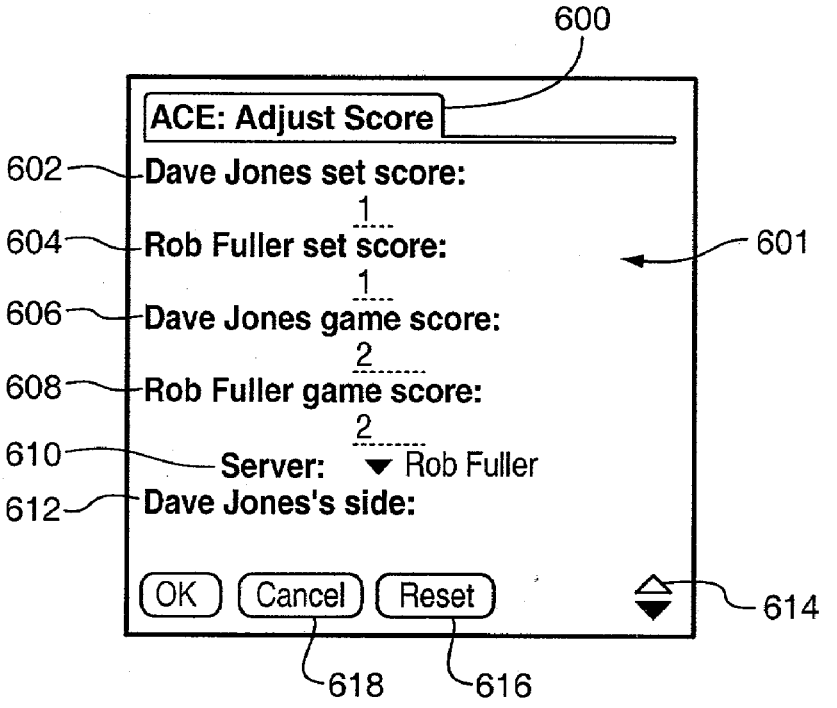

600
ACE: Adjust Score
602
Dave Jones set score:
1
604
Rob Fuller set score:
601
1
606
Dave Jones game score:
2
608
Rob Fuller game score:
2
610
Server:
Rob Fuller
612
Dave Jones's side:
OK
Cancel
Reset
614
618
616

FIG. 21

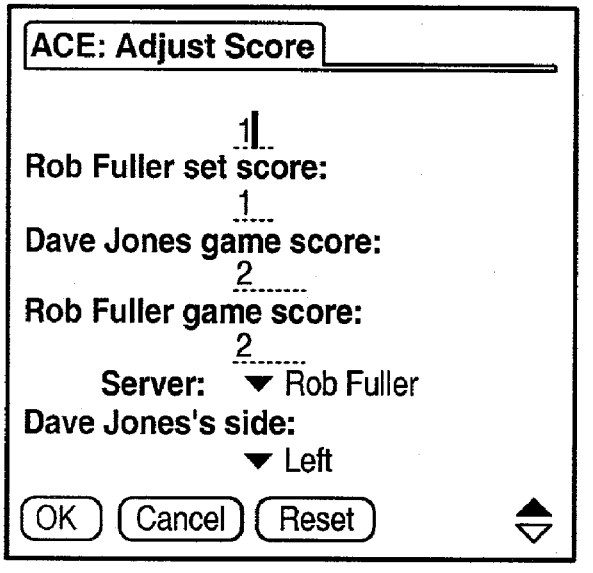

ACE: Adjust Score
1
Rob Fuller set score:
1
Dave Jones game score:
2
Rob Fuller game score:
2
Server:
Rob Fuller
Dave Jones's side:
Left
OK
Cancel
Reset

FIG. 22

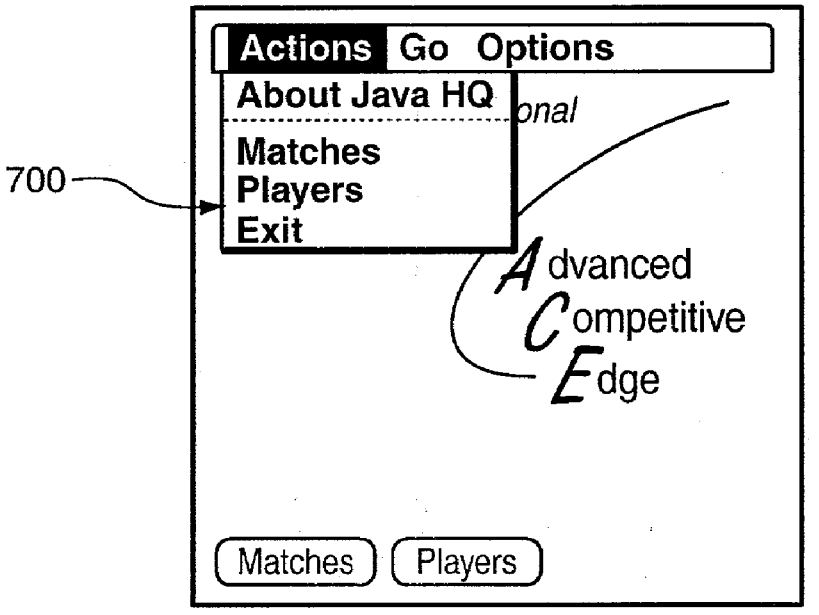

Actions Go Options
About Java HQ
Matches
Players
Exit
700
onal
Advanced
Competitive
Edge
Matches
Players

FIG. 23

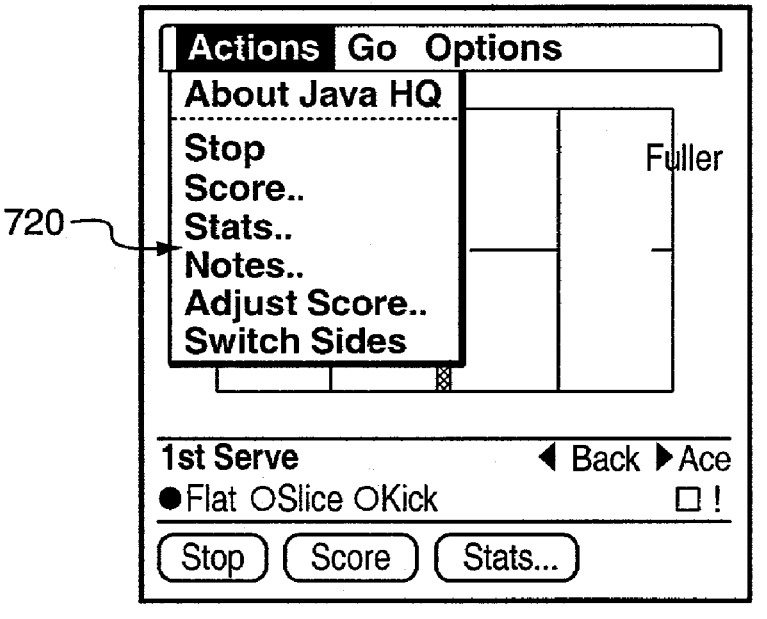

Actions Go Options
About Java HQ
Stop
Score..
Stats..
Notes..
Adjust Score..
Switch Sides
720
Fuller
1st Serve
Back
Ace
Flat
Slice
Kick
!
Stop
Score
Stats...

FIG. 24

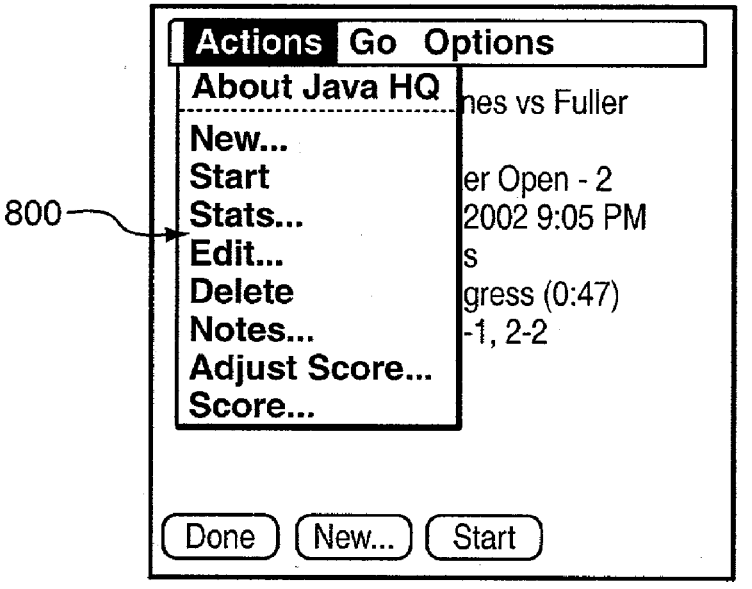

Actions Go Options
About Java HQ
New...
Start
Stats...
Edit...
Delete
Notes...
Adjust Score...
Score...
nes vs Fuller
er Open - 2
2002 9:05 PM
s
gress (0:47)
-1, 2-2
Done
New...
Start
800

FIG. 25

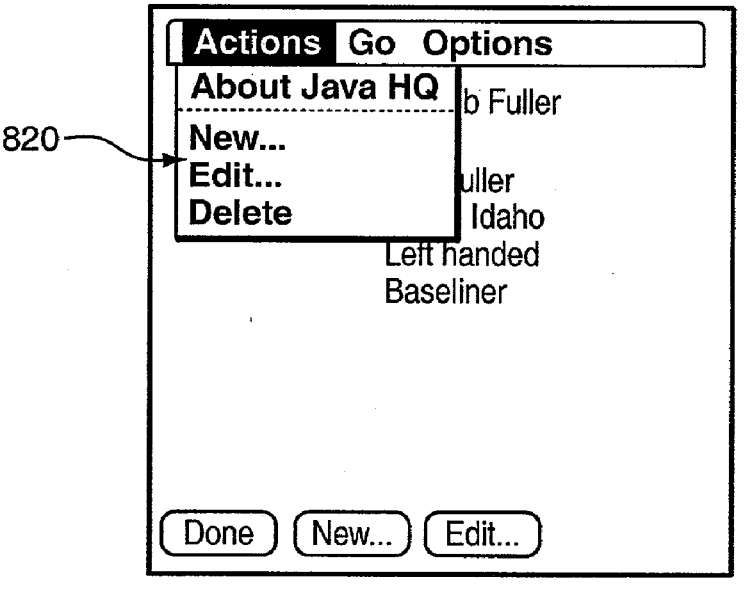

Actions Go Options
About Java HQ
New...
Edit...
Delete
b Fuller
uller
Idaho
Left handed
Baseliner
Done
New...
Edit...
820

FIG. 26

FIG. 27

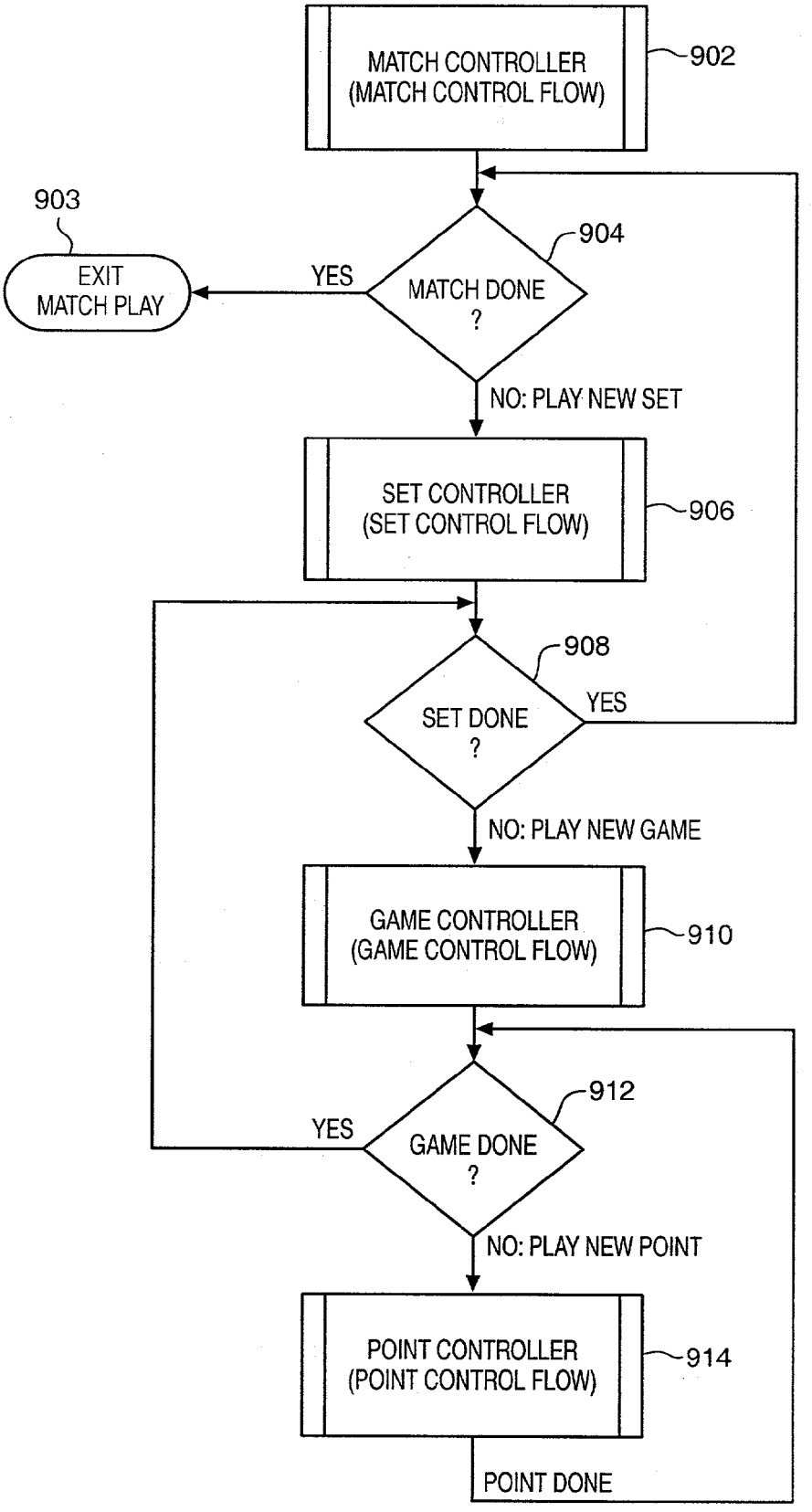

MATCH CONTROLLER
(MATCH CONTROL FLOW)
902
903
EXIT
MATCH PLAY
YES
MATCH DONE
?
904
NO: PLAY NEW SET
SET CONTROLLER
(SET CONTROL FLOW)
906
908
SET DONE
?
YES
NO: PLAY NEW GAME
GAME CONTROLLER
(GAME CONTROL FLOW)
910
912
YES
GAME DONE
?
NO: PLAY NEW POINT
POINT CONTROLLER
(POINT CONTROL FLOW)
914
POINT DONE

FIG. 28

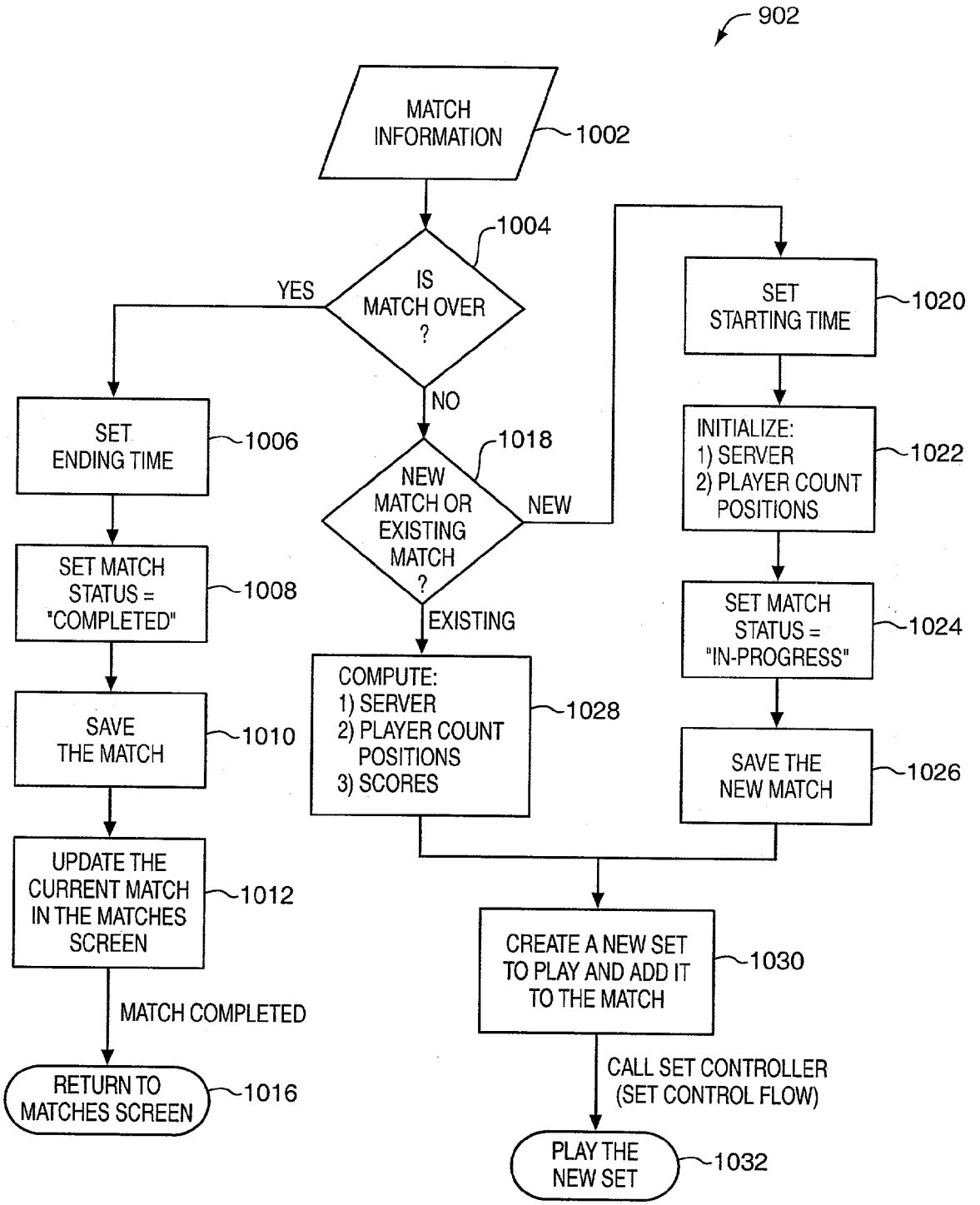

902
MATCH INFORMATION
1002
1004
IS MATCH OVER ?
YES
NO
SET ENDING TIME
1006
SET MATCH STATUS = "COMPLETED"
1008
SAVE THE MATCH
1010
UPDATE THE CURRENT MATCH IN THE MATCHES SCREEN
1012
MATCH COMPLETED
RETURN TO MATCHES SCREEN
1016
1018
NEW MATCH OR EXISTING MATCH ?
NEW
EXISTING
COMPUTE:
1) SERVER
2) PLAYER COUNT POSITIONS
3) SCORES
1028
SET STARTING TIME
1020
INITIALIZE:
1) SERVER
2) PLAYER COUNT POSITIONS
1022
SET MATCH STATUS = "IN-PROGRESS"
1024
SAVE THE NEW MATCH
1026
CREATE A NEW SET TO PLAY AND ADD IT TO THE MATCH
1030
CALL SET CONTROLLER (SET CONTROL FLOW)
PLAY THE NEW SET
1032

FIG. 29

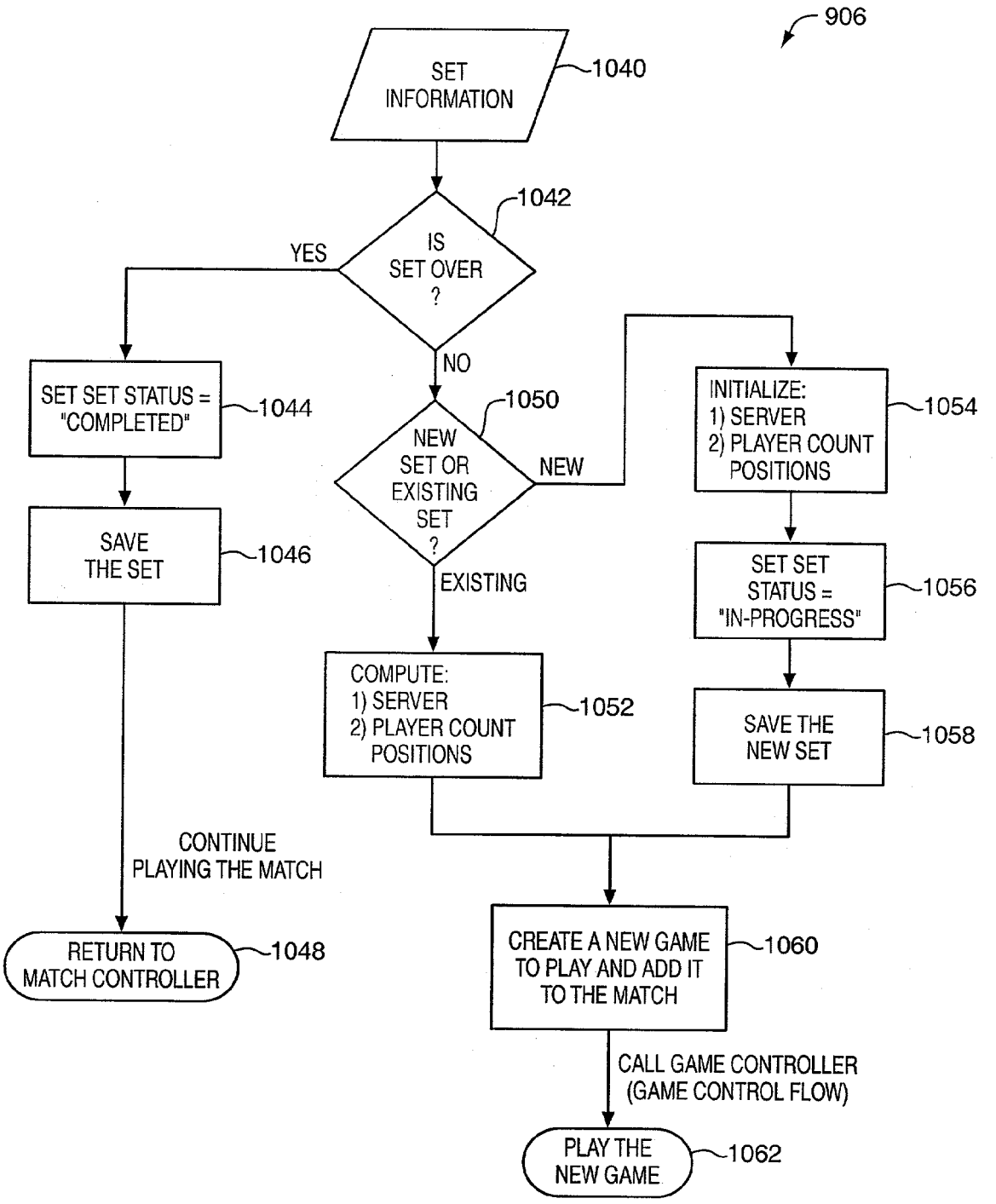

906
SET INFORMATION
1040
IS SET OVER ?
1042
YES
NO
SET SET STATUS = "COMPLETED"
1044
SAVE THE SET
1046
RETURN TO MATCH CONTROLLER
1048
CONTINUE PLAYING THE MATCH
NEW SET OR EXISTING SET ?
1050
NEW
EXISTING
COMPUTE: 1) SERVER 2) PLAYER COUNT POSITIONS
1052
INITIALIZE: 1) SERVER 2) PLAYER COUNT POSITIONS
1054
SET SET STATUS = "IN-PROGRESS"
1056
SAVE THE NEW SET
1058
CREATE A NEW GAME TO PLAY AND ADD IT TO THE MATCH
1060
CALL GAME CONTROLLER (GAME CONTROL FLOW)
PLAY THE NEW GAME
1062

FIG. 30

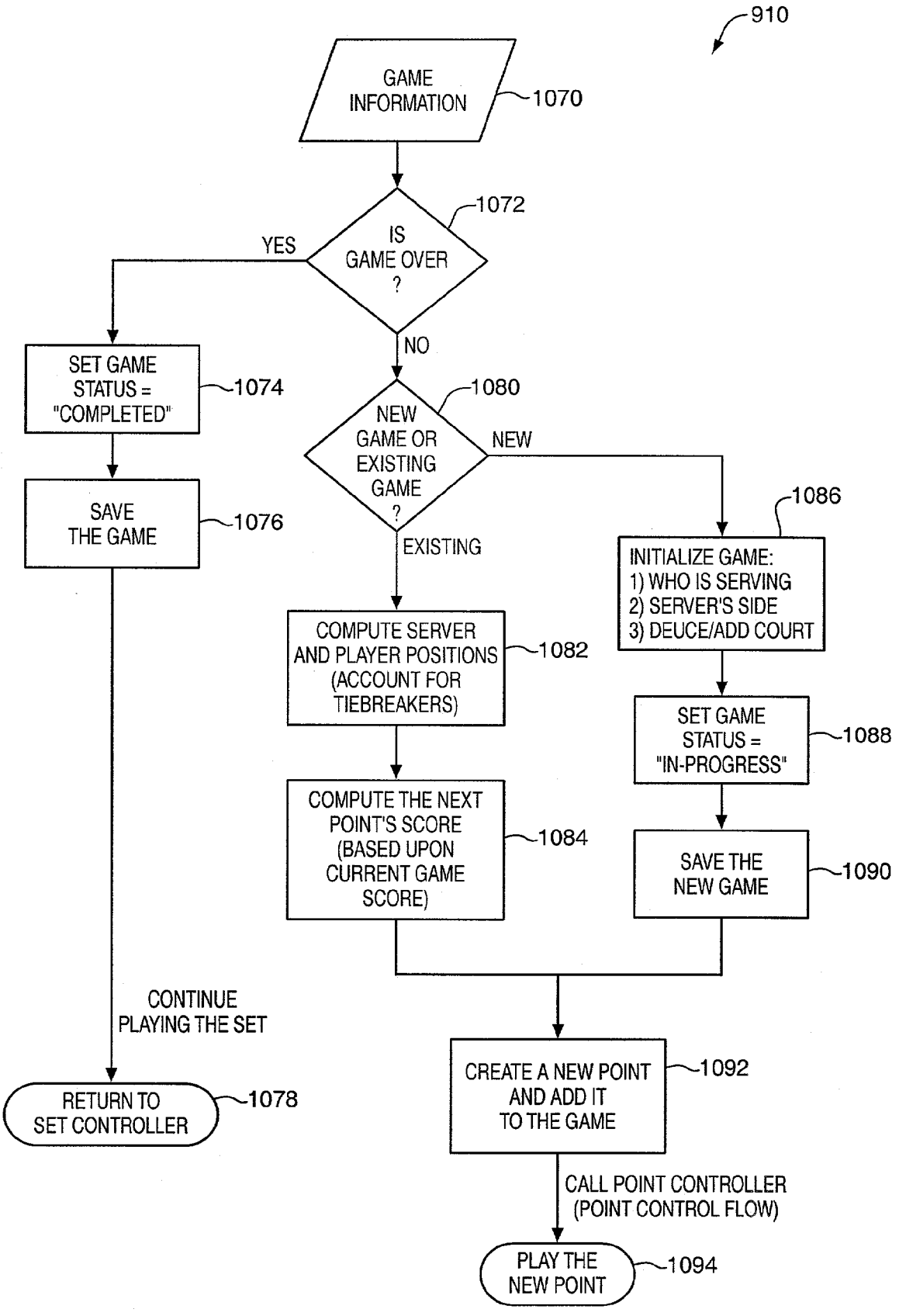
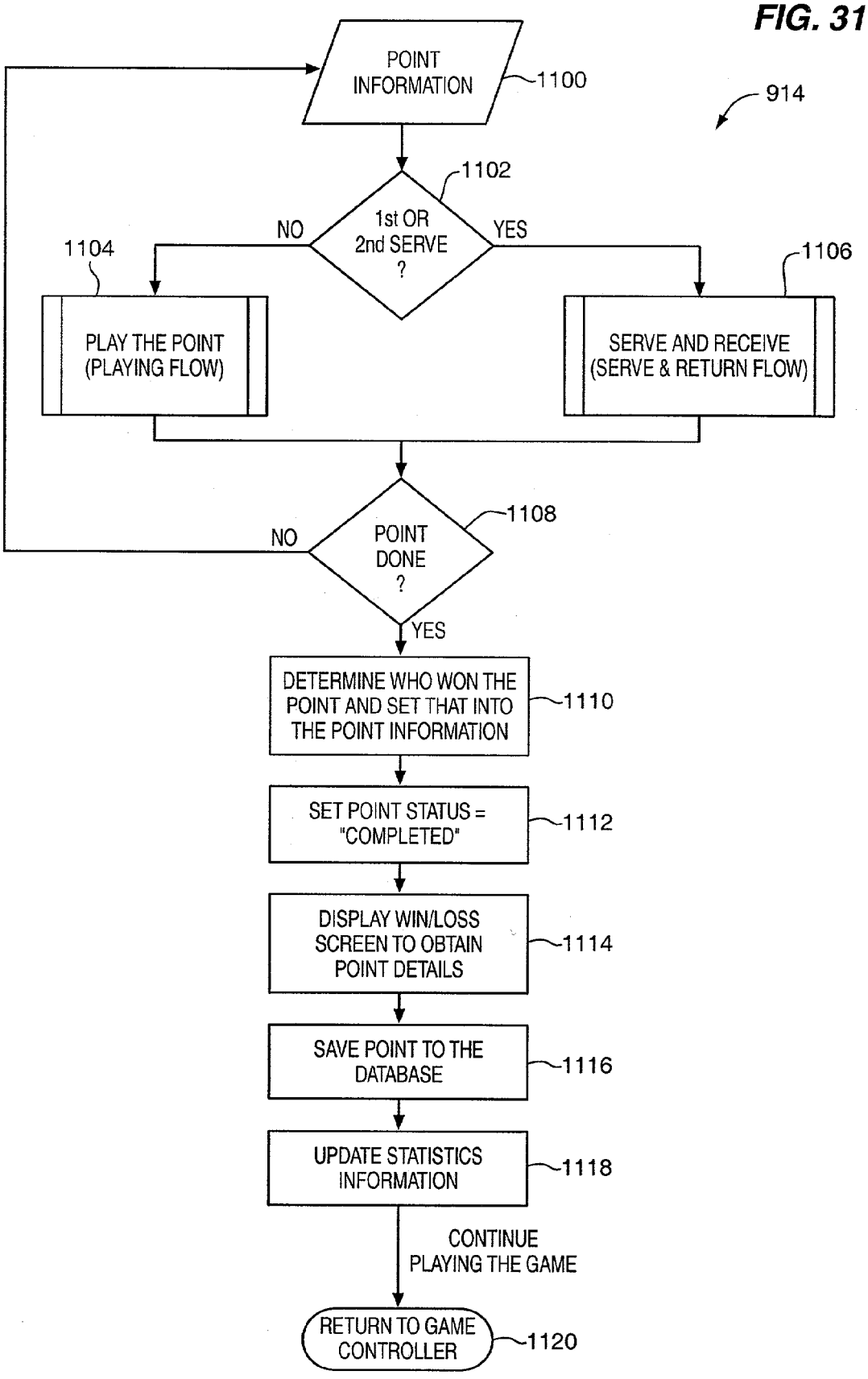

910
GAME INFORMATION
1070
IS GAME OVER ?
1072
YES
NO
SET GAME STATUS = "COMPLETED"
1074
SAVE THE GAME
1076
NEW GAME OR EXISTING GAME ?
1080
NEW
EXISTING
INITIALIZE GAME:
1) WHO IS SERVING
2) SERVER'S SIDE
3) DEUCE/ADD COURT
1086
COMPUTE SERVER AND PLAYER POSITIONS (ACCOUNT FOR TIEBREAKERS)
1082
SET GAME STATUS = "IN-PROGRESS"
1088
COMPUTE THE NEXT POINT'S SCORE (BASED UPON CURRENT GAME SCORE)
1084
SAVE THE NEW GAME
1090
CONTINUE PLAYING THE SET
RETURN TO SET CONTROLLER
1078
CREATE A NEW POINT AND ADD IT TO THE GAME
1092
CALL POINT CONTROLLER (POINT CONTROL FLOW)
PLAY THE NEW POINT
1094

FIG. 31


914
POINT INFORMATION
1100
1102
1st OR 2nd SERVE ?
NO
YES
1104
1106
PLAY THE POINT (PLAYING FLOW)
SERVE AND RECEIVE (SERVE & RETURN FLOW)
POINT DONE ?
1108
NO
YES
DETERMINE WHO WON THE POINT AND SET THAT INTO THE POINT INFORMATION
1110
SET POINT STATUS = "COMPLETED"
1112
DISPLAY WIN/LOSS SCREEN TO OBTAIN POINT DETAILS
1114
SAVE POINT TO THE DATABASE
1116
UPDATE STATISTICS INFORMATION
1118
CONTINUE PLAYING THE GAME
RETURN TO GAME CONTROLLER
1120

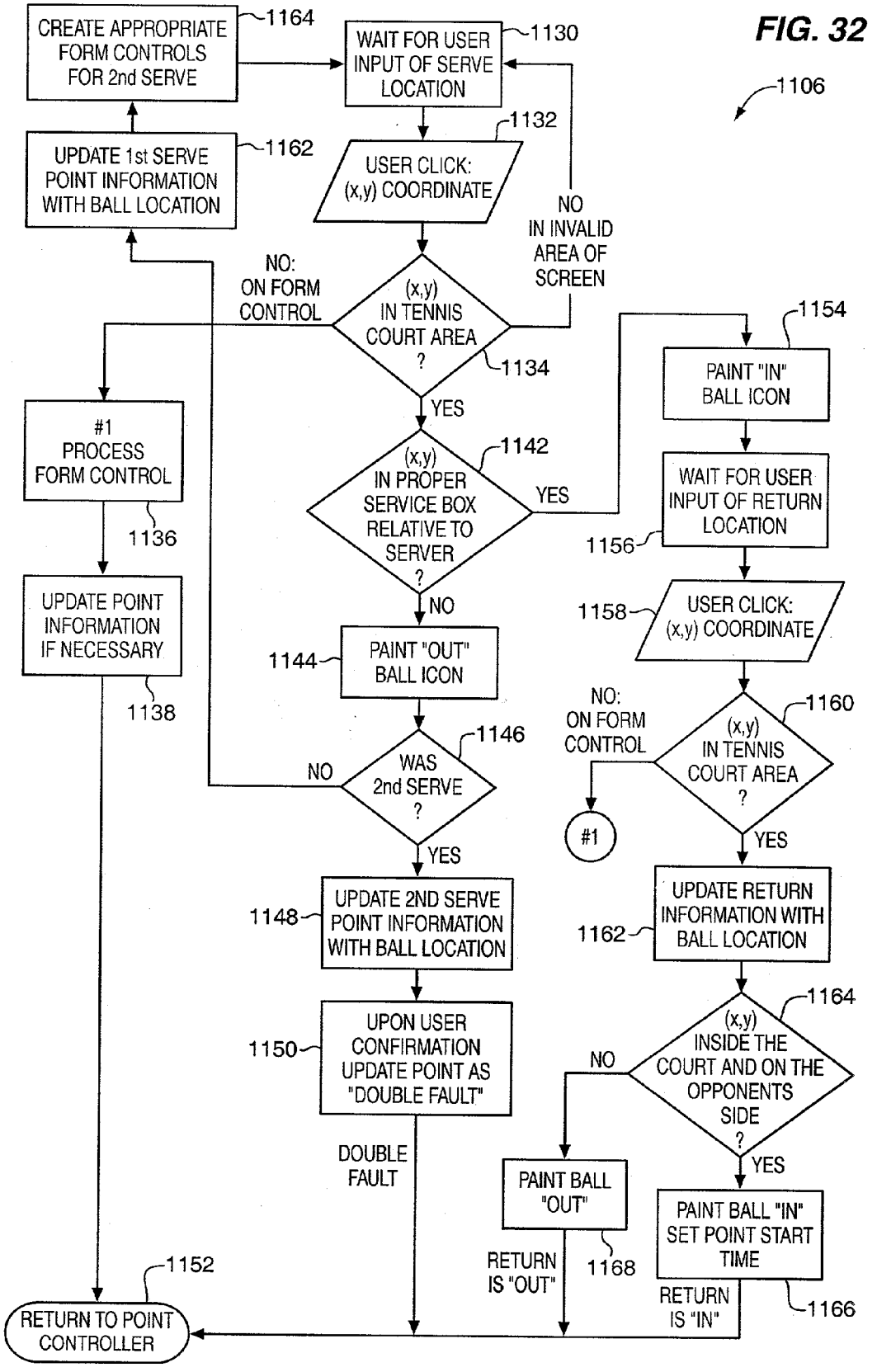
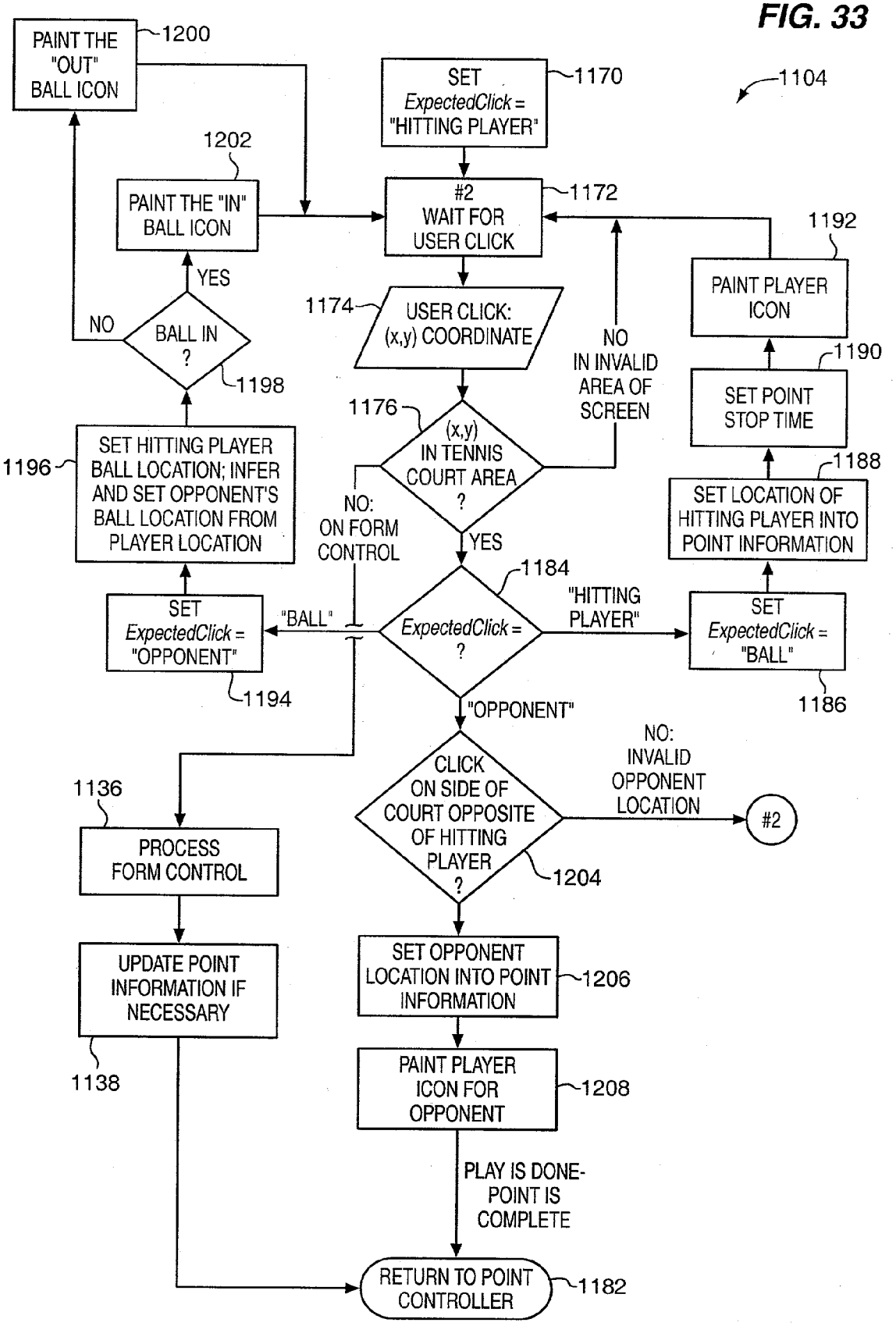

CREATE APPROPRIATE FORM CONTROLS FOR 2nd SERVE
1164
WAIT FOR USER INPUT OF SERVE LOCATION
1130
1106
UPDATE 1st SERVE POINT INFORMATION WITH BALL LOCATION
1162
USER CLICK: (x,y) COORDINATE
1132
NO IN INVALID AREA OF SCREEN
NO: ON FORM CONTROL
(x,y) IN TENNIS COURT AREA ?
1134
YES
#1 PROCESS FORM CONTROL
1136
(x,y) IN PROPER SERVICE BOX RELATIVE TO SERVER ?
1142
YES
NO
UPDATE POINT INFORMATION IF NECESSARY
1138
PAINT "OUT" BALL ICON
1144
WAS 2nd SERVE ?
1146
NO
YES
UPDATE 2ND SERVE POINT INFORMATION WITH BALL LOCATION
1148
UPON USER CONFIRMATION UPDATE POINT AS "DOUBLE FAULT"
1150
DOUBLE FAULT
1154
PAINT "IN" BALL ICON
WAIT FOR USER INPUT OF RETURN LOCATION
1156
USER CLICK: (x,y) COORDINATE
1158
NO: ON FORM CONTROL
(x,y) IN TENNIS COURT AREA ?
1160
#1
YES
UPDATE RETURN INFORMATION WITH BALL LOCATION
1162
(x,y) INSIDE THE COURT AND ON THE OPPONENTS SIDE ?
1164
NO
YES
PAINT BALL "OUT"
RETURN IS "OUT"
1168
PAINT BALL "IN" SET POINT START TIME
RETURN IS "IN"
1166
1152
RETURN TO POINT CONTROLLER

FIG. 32

FIG. 33


PAINT THE "OUT" BALL ICON
1200
SET ExpectedClick = "HITTING PLAYER"
1170
1104
1202
PAINT THE "IN" BALL ICON
#2 WAIT FOR USER CLICK
1172
1192
PAINT PLAYER ICON
YES
NO
BALL IN ?
1198
1174
USER CLICK: (x,y) COORDINATE
NO IN INVALID AREA OF SCREEN
1190
SET POINT STOP TIME
1176
(x,y) IN TENNIS COURT AREA ?
1188
SET LOCATION OF HITTING PLAYER INTO POINT INFORMATION
1196
SET HITTING PLAYER BALL LOCATION; INFER AND SET OPPONENT'S BALL LOCATION FROM PLAYER LOCATION
NO: ON FORM CONTROL
YES
1184
"HITTING PLAYER"
SET ExpectedClick = "BALL"
1186
SET ExpectedClick = "OPPONENT"
"BALL"
ExpectedClick = ?
1194
"OPPONENT"
NO: INVALID OPPONENT LOCATION
1136
CLICK ON SIDE OF COURT OPPOSITE OF HITTING PLAYER ?
#2
1204
PROCESS FORM CONTROL
SET OPPONENT LOCATION INTO POINT INFORMATION
1206
UPDATE POINT INFORMATION IF NECESSARY
PAINT PLAYER ICON FOR OPPONENT
1208
1138
PLAY IS DONE-POINT IS COMPLETE
RETURN TO POINT CONTROLLER
1182

SPORTS CHARTING SYSTEM

FIELD OF THE INVENTION

[0001] The field of invention involves a sports charting system that is operated on an electronic processing device.

PROBLEM

[0002] Many athletes today are engaged in an ongoing process to keep their bodies fit and discover or chart flaws and weaknesses of their own individual performances. By charting and correcting these flaws and weaknesses, they can effectively improve their own skill level. In addition, many athletes are further engaged in identifying or charting their opponent's flaws and weaknesses. This charting process can be beneficial for the athlete who can exploit his opponent's flaws and weaknesses. One such way an athlete can determine the flaws and weaknesses of his opponent is to chart his opponent's performances. For over a hundred years, baseball managers have been matching particular pitchers with particular batters, and vice versa, in hopes of increasing the success of the team, by increasing the particular outcome of the batter/pitcher duel. Almost all athletes today are benefited by careful data collection and statistical analysis of either their own performances or the performances of their opponents.

[0003] One problem with the current data collection process of an athlete's performance is the lack of user-friendly sports information gathering apparatus. It is known in the art that personal computers and laptop computers have been used at sporting events to chart the performance of athletes and competitors. However, these computers fail to have the necessary combination of mobility, portability and power self-sufficiency to effectively be transported between sports events and to be used by a user in the stands or by a coach on the sidelines of the sporting event.

[0004] Another problem with current statistical analysis of an athlete's performance is the lack of meaningful data. Existing sports information-gathering apparatus are limited by the functions that they offer. Some sports information gathering apparatus offer scheduling and opponents' contact information. Some sports information gathering apparatus offer limited charting capabilities, like charting only the serve of a player. Other sports information gathering apparatus offer season and league ranking systems. None of these sports information gathering apparatus are focused on charting a sports performance for the purpose of improving a player's skills and/or uncovering flaws and weaknesses of an opponent.

[0005] Another problem with current technology regarding data collection and statistical analysis is the cost. Existing sports information gathering apparatus are very expensive and generally beyond the affordability range of most players and coaches.

[0006] Another problem with current technology regarding data collection and statistical analysis is that the data cannot be entered in real-time. It is known in the art that some existing procedures for charting a sports performance involve recording on paper a limited amount of statistics and then later transferring the recorded paper results to a personal computer. Another such procedure involves mailing the paper record to another party who enters the data into another system and then transfers the summarized data to the player. This creates redundant data entry and time delay in receiving the charting results.

[0007] Another problem with current technology regarding data collection and statistical analysis is that the score and data must be entered by hand. In the prior art, a player's score is entered by marking certain score boxes. In the prior art, users are required to enter each single data point by clicking or highlighting boxes regarding the locations of the players and a ball. This is time consuming, difficult, and error-prone during a fast paced match.

[0008] Another problem with current technology regarding data collection and statistical analysis is the inability to chart several matches that are concurrently in play. If a person is charting a first match and later starts charting a second match, while the first match is still in play, the existing sports information gathering apparatus doesn't allow the person to return to the first match and update and adjust the score and player positions of the first match.

[0009] Another problem with current technology regarding data collection and statistical analysis is the lack of artificial intelligence. A person charting a particular match must enter by hand all of the data and information regarding a match and its players. The current technology doesn't offer artificial intelligence capabilities to heuristically predict data and information needed for the statistical analysis of a match. Without artificial intelligence, the user must enter far more information and data which is both time consuming and prone to error.

[0010] Information relevant to attempts to address these problems can be found in U.S. Pat. Nos. 4,237,372 issued Dec. 2, 1980 to Zevgolis, et al.; 5,153,826 issued Oct. 6, 1992 to Johnson; 4,128,893 issued Dec. 5, 1978 to Johnson, et al.; 5,134,565 issued Jul. 28, 1992 to Herbertz; 4,097,855 issued Jun. 27, 1978 to Salvo and 5,898,751 issue Apr. 27, 1999 to Yakoby, et al.;. However, each one of these references suffers from one or more of the following disadvantages: redundant and time consuming data entry, limited statistics, limited portability, lack of artificial intelligence and expensive applications.

SOLUTION

[0011] The above-described problems are solved and a technical advance achieved by the sports charting system that operates with existing electronic data processing devices to provide useful sports data and statistical analysis to athletes and coaches. The sports charting system operates on a computing system, such as the presently used standard personal computers, PDA's and PDA/cellular phones. The sports charting system can be easily transported to sporting events, and operated in the stands or on the sidelines of a sports event.

[0012] The sports charting system charts meaningful performance statistics of one or more players in a sports event or in a practice situation. The sports charting system records: players' position, sport apparatus position, real-time statistics and other meaningful data. The sports charting system also provides default values for a plethora of information derived from a player's properties profile to create a more efficient system for charting sports performances. The sports charting system generates trending information, tactical

information and practice drills from the stored statistics to assist a player in improving their game tactically and mechanically.

[0013] As data is being input by the user, the sports charting system generates and displays statistics on-the-fly and in real-time. The scoring for a sport performance is kept and displayed instantly in response to the input of players' locations and ball location.

[0014] In the example of a tennis match, the sports charting system generates statistics and data from the player locations and the ball location. For example, the sports charting system, upon a first service location out and a second service location out data input from a user, automatically generates a double fault statistic for the server without the user checking or highlighting an extra data entry for this statistic. The sports charting system automatically generates point statistics, upon the input from a user of a winning player's position, winning player's ball location and the losing player's position, without any further input from the user. The sports charting system knows the rules of tennis and dynamically derives, in real time, the status and score of a serve, point, game, set and match from the location of the players and ball relative to the sport environment. The sports charting system advances the score and places the players in the correct location relative to each other and the sports environment prior to the beginning of each point.

[0015] The sports charting system is capable of charting several matches that are being simultaneously played. A user of the sports charting system can chart several matches at the same time. The user can chart a first match with the sports charting system and then chart a second, third, fourth, etc. match. The user can then go back and forth between matches and update and adjust the score and player positions of the ongoing matches.

[0016] The sports charting system uses artificial intelligence to assist a user charting a sports performance in determining data and information. The sports charting system heuristically predicts default values based on player profile information, sport performance rules, common practices and well-established facts of a particular sport. The data and information generated by the artificial intelligence reduces the amount of data and information that the user must enter and reduces the amount of errors due to human input.

[0017] While the present invention is contemplated primarily for utilization with tennis, it is noted that the sports charting system is likewise suitable for utilization with other diverse sports employing a field or court, including, for example: volleyball, horseshoes, football, baseball, hockey, soccer, rugby, cricket, foosball, basketball, and the like. The above and other problems are solved and an advance in the art is made by the sports charting system.

DESCRIPTION OF THE DRAWINGS

[0018] The above and other features of present invention can be better understood from a reading of the detailed description and the following drawings:

[0019] **FIGS. 1A, 1B** and 1C illustrate electrical devices that operate the sports charting system;

[0020] **FIG. 2** illustrates the home display for the sports charting system;

[0021] **FIG. 3** illustrates a players display of the sports charting system;

[0022] FIGS. **4-6** illustrate a player properties display of the sports charting system;

[0023] **FIG. 7** illustrates a matches display of the sports charting system;

[0024] **FIGS. 8 and 9** illustrate a match properties display of the sports a charting system;

[0025] **FIG. 10** illustrates the match notes display of the sports charting system;

[0026] **FIG. 11** illustrates a first serve display of the sports charting system;

[0027] **FIG. 12** illustrates a second serve display of the sports charting system;

[0028] **FIG. 13** illustrates a playing display of the sports charting system;

[0029] **FIG. 14** illustrates a playing display with a player and ball of the sports charting system;

[0030] **FIG. 15** illustrates a win/loss—playing display of the sports charting system;

[0031] **FIG. 16** illustrates a win/loss—return display of the sports charting system;

[0032] FIGS. **17-19** illustrate a statistics display of the sports charting system;

[0033] **FIG. 20** illustrates a scoreboard screen display of the sports charting system;

[0034] FIGS. **21-22** illustrate an adjust score display of the sports charting system;

[0035] **FIG. 23** illustrates a main screen menus display of the sports charting system;

[0036] **FIG. 24** illustrates a serving and playing menus display of the sports charting system;

[0037] **FIG. 25** illustrates a matches dialog menus display of the sports charting system;

[0038] **FIG. 26** illustrates a players dialog menus display of the sports charting system;

[0039] **FIG. 27** illustrates in flow diagram form the sports charting system processes for generating the required matches, sets, games, points and serves in a match;

[0040] **FIG. 28** illustrates in flow diagram form the sports charting system match controller;

[0041] **FIG. 29** illustrates in flow diagram form the sports charting system set controller;

[0042] **FIG. 30** illustrates in flow diagram form the sports charting system game controller;

[0043] **FIG. 31** illustrates in flow diagram form the sports charting system point controller;

[0044] **FIG. 32** illustrates in flow diagram form the sports charting system serve and return flow; and

[0045] **FIG. 33** illustrates in flow diagram form the sports charting system play and point flow.

DETAILED DESCRIPTION

[0046] The sports charting system is capable of charting several concurrently active sporting performances of at least one player. To illustrate one embodiment of the present invention, the sport of tennis is described in detail below. Though tennis is one sport, the sports charting system is capable of charting many other sports. The sports charting system is operated on electronic processing devices and the data collected on one device is easily stored, displayed and transferred or downloaded to another electronic processing device.

[0047] A sporting performance is any activity involving physical exertion and having a set form and body of rules, which are stored in the sports charting system. The sports charting system utilizes the stored set of sport performance rules to make determinations regarding the score, player location, statistics and status of a point in a sporting performance. For example, in tennis when a player hits a ball out of bounds the sport performance rule is that the ball is out of play and that a certain player's score is advanced in a well-defined way because of the errant shot. The sport performance rules also describe the actions regarding scoring and statistics with respect to the specific events during a sport performance. The sports charting system, upon the input of data by a user that is indicative of an errant shot from a player, automatically makes the determination that the ball is out of play and advances the score and player location of the opposing player according to the rules of tennis and keeps statistics regarding the point, all based on the user input of a ball location. In another example, when the user inputs two consecutive serve locations as faults, then the sports charting system makes the determination that the ball was not served within the service court for two consecutive serves by the server and automatically advances the score of the non-serving player according to the rules of tennis and keeps statistics regarding the serve, all based on the user input of a ball location. In another example, the sports charting system, determines the score, player location, statistics and status of a point based on the user input of a winning point player's location, the ball location and the losing point player's location.

[0048] The sport performance rules include rules that pertain to score and statistics with regard to a particular sport performance. For example, in a basketball game, if a player dribbles the ball out of bounds the sport performance rules for basketball state that when a player dribbling a ball steps out of bounds or dribbles the ball out of bounds, then the ball is turned over to the other team for a throw in at the location that the player went out of bounds. For another example, in tennis, if a player hits the ball into the net and not over the net, then the score advances in a well-defined way for the opposing player. These rules are the cornerstone of all sporting performances. They define the sport performance and give the participants clear expectations regarding playing the sporting performance. Sport performance rules include the playing boundaries of the sport environment, size of the sport apparatus, number or participants, number of referees, etc. Sport performance rules also include what constitutes scoring and penalties of a sport performance.

[0049] The sporting charting system stores and displays the sport performance rules of a particular sport. The sport performance rules are stored to enable the sports charting system to make determinations regarding the score and statistics based solely upon player and sport apparatus locations as inputted by the user. The sports charting system displays the rules to a user or player in order to assist the players in solving rule-based disputes. In the example of charting a tennis match, the sports charting system rules include USTA tennis rules, NCAA tennis rules and USTA code of conduct.

[0050] The sporting performance can be played by one or more persons. In addition, the sporting performance can be played by one or more teams. A partial and non-inclusive list of sporting events includes: volleyball, horseshoes, football, baseball, hockey, soccer, rugby, cricket, foosball, basketball, and the like.

[0051] A sport environment is an area in which a sporting performance takes place. The sport environment usually has physical boundaries that define the sport environment. In the present invention, the sport environment is a tennis court. A sport apparatus is an object that is hit, chased, thrown, tossed, kicked, carried and struck pursuant to being used in a sporting performance. For instance, in a tennis match the sport apparatus is the tennis ball. In a hockey game the sport apparatus is the puck. In football, the sport apparatus is the football and in soccer, it's the soccer ball. The sport apparatus positional data is the position of the sport apparatus relative to the sport environment and players. The player positional data is the position of a player relative to the sport environment. Player positional data is also the position of a player relative to another player or to the sports apparatus.

[0052] A sport match definition is the general structure of the sporting performance. For example, sport match definition for a tennis match are 3-set matches, 5-set matches, Pro-Set matches, or other match subdivision definitions. Another example would be whether a baseball game is a 9-inning game or a 7-inning game. A sport match definition subdivision is the subdivision of the sport match definitions. For example, a standard 3-set has subdivisions such as games, points, tiebreak points and serves, all which the sports charting system generates. The user enters the sport match definition and the sports charting system generates the required number of sport match definition subdivision.

[0053] The sport game orientation means the orientation of the sport environment relative to the system. For example, a side view of a tennis court means that the sidelines of the tennis court are horizontal as viewed by the user. An end view of a tennis court means that the baseline of the tennis court is horizontal as viewed by the user. This enables the user to view the tennis court on the sports charting system as the user views the tennis court of the match the user is charting. The user can input environmental data and relevant variables that may impact a player's performance that is related to the sporting performance. For example, in a tennis match the user inputs environmental data like the type of court surface, temperature, wind speed, etc. Relevant variables that may impact a player's performance include number of days between sporting events, official nature of sporting event (practice versus professional competition), diet, and the like.

[0054] Layout of the Sports Charting System

[0055] **FIG. 1A** is an illustration of a typical computing device, such as a personal digital assistant (PDA), **FIG. 1B**

is an illustration of a personal computer and **FIG. 1C** is an illustration of a cellular phone/PDA combination. The sports charting system is capable of operating on these and other electronic processing devices. **FIG. 2** is an illustration of the home display **202** of the sports charting system. The home display **202** is the display of a PDA, personal computer, cellular phone/PDA combination or other electronic processing device. The display **202** is capable of accepting input from the user. The sports charting system typically comprises software (or a combination of software and hardware) that is operable in the computing device to perform the functions as described herein. Since the sports charting system typically comprises program instructions, it is disclosed in the Figures herein as a series of flow diagrams that illustrate the operation of these program instructions. The sports charting system is an interactive system that requires user input to direct it's processing and displaying functions. The user input can be the point and click of a mouse on a personal computer, a pressure sensitive touch on a PDA screen, or other electronic apparatus inputting actions and devices such as: a keyboard, knobs, spin controls, joy sticks, touch pads and roller balls among other conventional inputting apparatuses. On the home display **202** are a players selection **206** and a matches selection **204**.

[**0056**] **FIG. 3** is an illustration of a players display **213** when the players selection **206** is selected. The players display **213** comprises a players menu **212** which is a pull-down menu that lists the players and teams currently stored in the sports charting system. The players display **213** also displays general profile data **214** for a player or a team. The "done" selection **216** stores the players display **213** into the sports charting system and returns to the home display **202**. **FIGS. 4, 5** and **6** are an illustration of a player properties display **230**. In **FIG. 3**, the new selection **218** allows a user to input a new player or team profile data into the player properties display **230**. The edit selection **220** allows a user to edit a stored player or team profile data stored in the sports charting system. The sports charting system charts one or more players and teams simultaneously. The sports charting system captures information about every point played in a match. The sports charting system charts one or more players in practice to generate appropriate drills for each player to practice. Using match data, the sports charting system also generates suggested practice drills techniques and strategies based on players' performance.

[**0057**] The player properties display **230** displays and accepts user input for player or team profile data such as first name data field **231**, last name data field **232**, age data field **233**, city data field **234** and state data field **235**. The player properties display **230** also displays and accepts user input for sport specific player or team profile data in pull-down menus such as left/right handedness menu **236**, forehand menu **237**, backhand menu **238**, typical forehand menu **241**, typical backhand menu **242** and weapon menu **244**. These pull-down menus contain lists of typical selections for each menu display. For instance, the left/right handedness menu **236** lists left or right as selections the user may select. Also the forehand menu **237** and backhand menu **238** each list selections one handed or two handed. The typical forehand menu **242** and typical backhand menu **242** list selections such as topspin, flat or slice. Player properties OK selection **239** stores the inputted data to persistent storage. Player properties cancel selection **240** returns to the player display **213**.

[**0058**] The player properties display **230** also displays and accepts user input for player and team profile data such as a first serve menu **246** and second serve menu **248**, both of which are pull-down menus that list flat, kick or slice as selections the user can select. The player properties display **230** also displays and accepts user input for player and team profile data such as style of play **250** which is a pull-down menu that lists all-court, baseliner, counter-puncher and serve and volley as selections the user can select. The player properties display **230** also displays and accepts user input for player and team profile data such as a good under pressure menu **260** and a comes from behind menu **262** both of which are pull-down menus that list yes or no as selections the user can select. The player properties display **230** also displays and accepts user input for player and team profile data in a notes section **264** that allows the user to type text freeform comments or notes related to a particular player. The player properties display stores other player profile data such as conditioning information, fitness schedules and player nutritional information.

[**0059**] **FIG. 7** is an illustration of the matches display **271** when the matches selection **204** is selected. Matches display **271** displays and accepts user input for match data. The matches display **271** displays and accepts user input for matches data in a competitors menu **270** which is a pull-down menu that lists stored competitors match ups. Match general information display **272** displays the summary of the match data stored for a particular selected match. When the done selection **278** is selected the home display **202** is displayed. When the new selection **276** is selected a match properties display **289** is displayed, as shown in **FIG. 8**. When the start selection **274** is selected the first serve display **430** is displayed as shown in **FIG. 11**.

[**0060**] **FIGS. 8 and 9** are an illustration of the match properties display **289**. The match properties display **289** displays and accepts user input for match data. Match properties display **289** comprises a tournament field **290** for entering the title of a match. Match properties display **289** also displays and accepts user input for matches data in a round field **292**. The date field **294** is automatically generated by the sports charting system. Match properties display **289** also displays and accepts user input for matches data in a surface menu **296** which is a pull-down menu that lists grass, hardcourt and clay as selections the user can select. Match properties display **289** also displays and accepts user input for matches data in a player menu **298** and an opponent menu **300** which are pull-down menus that lists stored players and teams in the sports charting system that the user can select. Match properties display **289** also displays and accepts user input for matches data in a type menu **302** which is a pull-down menu that lists 3-Set, 5-Set and Pro-Set as selections the user can select. The sports charting system also creates custom scoring formats such as **8** game pro-set, no-add scoring, 7-point tiebreaker at 8 all, etc. The sports charting system stores multiple matches. Further, the sports charting system plays several matches simultaneously, enabling the user to chart several matches at the same time.

[**0061**] Match properties display **289** also displays and accepts user input for matches data in a no-add scoring menu **304** and a tiebreaker menu **310** which are a pull-down menus that lists "yes" or "no" as selections that the user can select. When the match properties OK selection **305** is selected the user input regarding the match properties is stored to the

sports charting system and the matches display **271** is displayed. When the cancel selection **306** the user input regarding the match properties is not stored to the sports charting system and the matches display **271** is displayed. The match properties display **289** also displays and accepts user input for matches data in a points in tiebreaker data entry field **312** where the user inputs the number of points of the tiebreaker. The match properties display **289** also displays and accepts user input for matches data in a serving first menu **314** the stored players or teams entered in the player menu **298** and opponent menu **300** as entered prior by the user. The match properties display **289** also displays and accepts user input for matches data in a starts on side menu **316** which allows the user to input the orientation of the players prior to the start of a match. **FIG. 10** is an illustration of the match notes display **321** that allows the user to type text freeform notes **320** related to a particular match. The sports charting system is capable of switching court perspective as viewed by the user. If the user is viewing the match from the end of the court then the tennis court display **406** can be displayed relative to the sports charting system 90 degrees to reflect the end view of the user. The sports charting system can display can be switched from side to side or end to end to reflect the view of the match of the user.

[**0062**] **FIG. 11** is an illustration of the first serve display **430** of the sports charting system. A first player score **404** is displayed at the top left of the first serve display **430** and notes the sets, games and points from left to right for a first player. A second player score **402** is displayed at the top right of the serve display **430** and notes the points, games and sets from left to right for a second player. The first serve display **430** also includes a tennis court display **406**. From the user inputted information the sports charting system places a first player **410** and a second player **408** in the required orientation with respect to the tennis court. This means that before the first serve of the match the players are located on in the deuce court and on the side according to the information provided by the user in the starts on side menu **316**. Service display **416** shows that this is a first serve. The service type selection box **412** displays the choices of serve for the first serve. The user enters the type of first service in the service selection box **412**. A service default value **414** is highlighted and corresponds to the player profile data for that particular player's first service as entered by the user during the player properties data entry. If the first serve is an ace, the user inputs the ace selection **420** and the sports charting system will automatically adjust the score of the match. If the point is a "pressure point" or one which is tension filled, such as a set point, break point, etc., then the user selects the pressure point selection **422**. The pressure point selection **422** assists the user in charting the pressure points won by a player or an opponent. Selecting the stop selection **424** pauses the match and returns the sports charting system to the matches display **271**. Selecting the score selection **426** will display the scoreboard display **570** as in **FIG. 20**. Selecting the stats selection **428** will display the player statistics display **521** as in **FIG. 17**. Serving player marker **403** displays which player is currently serving.

[**0063**] Default values are used by the sports charting system to anticipate real play, to expedite the data inputting process of the user and to reduce the number of erroneous inputs by the user. By storing player profile data entered by a user before a match begins, the sports charting system is able to enter specific player profile data into the corresponding data entry point alleviating the need by the user to do so. If a particular player has a strong forehand or backhand weapon, then the user notes it in the player profile section and the sports charting system will use this forehand or backhand value for the side shot hit on when the particular player hits a shot. The default values are also used in conjunction with player positional information to heuristically guess at forehand and backhand defaults. For example, if a player who is right-handed and is hitting cross-court shots in the deuce court, the sports charting system will heuristically predict that the player is hitting forehand shots. If in this example the player is the point winning player, then the default value for the winning point player shot side hit on selection **486** will be forehand. In another example, if the player is left-handed and is hitting cross-court shots in the add court, the sports charting system will heuristically predict that the player is hitting forehand shots. If in this example the player is the point winning player, then the default value for the winning point player shot side hit on selection **486** will be forehand. These default values can be changed by the user.

[**0064**] The sports charting system generates real-time statistics from the user input of the player position and the ball location during a match. The statistics can be viewed as entire match or displayed by set. The statistics can be viewed selectably such as by first set only, second set only, third set only, fourth set only or fifth set only. Allowing the user to view the statistics in any custom manner the user chooses, assists the user in determining whether a particular player is slow to warm up or quick to expire and other time-oriented trend analysis. The sports charting system is further capable of custom querying stored real-time statistics to answer virtually any kind of query regarding a particular player in a match or practice setting. For instance, the user may query if a particular player is at the net what happens, is that player generally successful or generally not successful when the player is located at the net. The sports charting system could further provide an answer to a custom query from the user regarding a particular player's backhand errors or where the opponent is most successful hitting winning shots.

[**0065**] The sports charting system also displays and determines tactical mistakes in structured format by either player. The sports charting system also charts the player stroke mechanics (e.g., weak wrist, etc.) in structured format by entering this data into the player profile (not shown). The sports charting system also recommends useful training techniques (i.e. practice drills) based upon statistics gathered. A user can input the results of the practice drills into the sports charting system and the sports charting system charts the practice drills to determine progress made.

[**0066**] The tactical information stored in the sports charting system includes information regarding a player's position relative to a losing shot, a player's position relative to a winning shot, a player's positional relationship to an opponent during a winning shot and a player's positional relationship to an opponent during a losing shot. Tactical information also includes a player's positional relationship relative to the sport environment and opponent's positional relationship relative to the sport environment. Tactical information also includes team member's positions to each other relative to a winning shot and team member's positions to each other relative to losing shot.

[0067] The first serve display **430** is an active screen and accepts input as to the ball location of the first serve. The sports charting system displays the location on the first serve display **430** of the ball location of the first serve as entered by the user. **FIG. 11** displays an in serve marking **405** that is in the delimiters of the field of play. **FIG. 12** is an illustration of the second serve display **441**. The second serve display **441** is displayed when the first serve is out. Second serve display **441** displays where the first serve is located by an out serve marking **440**. In serve marking **405** and out serve marking **440** have different designs to assure the user that the sports charting system correctly noted the user input regarding the ball location. The out serve marking **440** is an "X" and the in serve marking **405** is in the shape of a tennis ball. These are not limiting markings as the out serve marking **440** and the in serve marking **405** can be any design that differentiates an in serve from an out serve. **FIG. 12** has many of the same features or displays as **FIG. 11** and their description will not be repeated.

[0068] The second serve display **441** displays the same service type selection box **412** as in the first serve display **430**. The inputted service default value **414** for the second serve is a kick serve in **FIG. 12**. The kick serve value was entered in the player properties by the user and is used as a default value in **FIG. 12**. This value can be changed to accommodate a change in type of service. If the second serve is marked out (not shown) then the sports charting system determines that a double fault has occurred and the score is automatically adjusted according to the rules of tennis. If either the first or second serve is in, then the sports charting system waits for the user to enter a service return ball location (not shown).

[0069] Once the service return ball location is highlighted or selected on the tennis court display **406** as being within the boundaries of the tennis court display **406**, the sports charting system then displays the playing screen display **449** as in **FIG. 13**. If the user inputs the ball location of the service return to be out of the court, then the sports charting system places an "X" on the out of bounds service return and automatically adjusts the score of the match once it receives stroke data regarding the errant shot. The playing screen display **449** has a playing display **450** to inform the user that a point is being played. The actual strokes can be counted by entering each stroke into the stroke counter **452**. The return winner selection **454** informs the sports charting system that the service return was a winning point and automatically adjusts the score of the match once it receives information regarding the winning shot. The back selection **455** returns in successive steps to the beginning of the current point of the match. Each click of the back selection **455** goes backward one logical step. For example, if the first serve is out, the second serve is in and the service return is in, then the sports charting system displays the playing screen display **461** (as shown in **FIG. 14**). When the back selection **455** is input the sports charting system returns to the second serve. Upon a further input of the back selection **455**, the sports charting system returns to the first serve.

[0070] **FIG. 14** is an illustration of the playing screen display **461** with a point winning player location **460**. The sports charting system displays the position on the tennis court display **406** of the point winning player location **460** corresponding to the user input of the point winning player location **460**. The user then inputs the point winning player's ball location **462** on the tennis court display **406**. The user then inputs the point losing player's location **463**. The sports charting system determines that the point is over and displays the win/loss-playing display **477** as in **FIG. 15**. The sports charting system determines the winning player and losing player of the previous point by the location of the point losing player location **463**, the point winning player's ball location **462** and the point losing player location **463**. The sports charting system also sets the ball location of the point losing player equal to the position of the point winning player location **460** when the point winning player location **460** is located within the boundaries of the point winning player's side of the tennis court. Where the point winning player location **460** is located outside the boundaries of the point winning player's side of the tennis court, then the sports charting system places the ball location of the point losing player inside the boundaries of the point winning player nearest the point winning player location **460**. The sports charting system captures point winning player location **460**, the point losing player location **463**, the point winning player's ball location **462** and the losing player's ball location **461**. The sports charting system determines, for charting purposes, the successes and failures of the players and teams involved in the sport.

[0071] The sports charting system scores matches automatically. The sports charting system requires no score input from the user. In one aspect, the sports charting system automatically determines the score in a match, set, game, point and serve and the locations of the players by the user inputs of the winning point player, the winning player ball location and the losing player location. In another aspect, the sports charting system automatically determines the score of a point by the losing point player location, the losing point player ball location and the winning point player location. In another aspect, the sports charting system automatically determines the score by the user inputs of a double fault. In another aspect, the sports charting system automatically determines the score by the user inputs of an ace serve. In another aspect, the sports charting system automatically determines the score by the user inputs of a losing player location and the location of an out ball. These inputting sequences and data inputs are not limitations to the system which is described herein, since a novel system concept is disclosed, not a specific inputting or data sequence limited implementation of an existing system concept.

[0072] **FIG. 15** is an illustration of the win/loss-playing display **477** which is displayed once a point has finished. The back selection **478** returns the playing screen display **461**. The back selection **478** can return to as many previous strokes, serves, games, sets and matches as the user desires. The next selection **480** displays the first serve display **430** for the next point to be played. The win/loss-playing display **477** displays the point winning player **470**, point winning player information **482** and the point winning player location **460** from the user input from the previous point. The sports charting system determines the point winning player charting location **484** by placing an "x" mark in either the approach or at net checkboxes in the point winning player charting location **484**. This value can be changed by the user by inputting the appropriate value. The sports charting system captures net approaches, by determining the location of the players relative to the tennis court display **406**. The

sports charting system will determine that a player was at the net, if a user inputs a player's location as being between the net and the service line.

[0073] Other information that is displayed by the win/loss-playing display **477** is the winning point player shot side hit on selection **486**. A default value is displayed, which is derived from the player's positions as inputted by the user and the weapon menu **244** information as inputted by the user. The win/loss-playing display **477** also displays the type of point winning shot **488**. The sports charting system determines the type of point winning shot **488**, whether it is a groundstroke, overhead, dropshot, lob or volley, by the location of the point winning player location **460** relative to the tennis court display **406** and the point losing player's location **463** and the point winning player's ball location **462**. The point losing player information **490** are also charted and displayed by the sports charting system. The point losing player charting location **492** is displayed and contains the checkboxes regarding the location of this player. The sport charting system determines the point losing player charting location **492** from the input of the point losing player location **463** from the user. Other information that is displayed by the win/loss-playing display **477** is the losing point player shot side hit on selection **486**. A default value is displayed, which is derived from the player's positions as inputted by the user and the weapon menu **244** information as inputted by the user. The sports charting system uses the weapon menu **244** information inputted by the user as the default value. The win/loss-playing display **477** also displays the type of point losing shot **496**. The sports charting system determines the type of point losing shot **496**, whether it is a groundstroke, overhead, dropshot, lob or volley, by the location of the point losing player's location **463** relative to the tennis court display **406** and the point winning player's location **460** and the point winning player's ball location **462**.

[0074] **FIG. 16** is an illustration of the win/loss-return display **503** which is displayed when the winning point is won on a service return. The win/loss-return display **503** displays the point winning player **470**. The winning point can be marked as a serve and volley point by marking the serve and volley checkbox **510**. If the user entered serve and volley in the style of play **250** in the player properties display **230**, then the sports charting system will use this value as a default value for the serve and volley checkbox **510** and the serve and volley checkbox **510** will have be selected. The win/loss-return display **503** also displays the point losing player information-return **502**. Included in these point losing player information-return **502** are a checkbox that the user can check to indicate whether the point losing player was approaching the net **504** or an unforced error **506**. The win/loss-return display **503** also displays the type of point losing shot **508**. The sports charting system determines the type of point losing shot **508**, whether it is a groundstroke, overhead, dropshot, lob or volley, by the location of the point losing player location **463** relative to the tennis court display **406** and the point winning player's location **460** and the point winning player's ball location **462**.

[0075] **FIGS. 17, 18** and **19** are illustrations of a player's statistics display **521**. These statistics are kept for all players and teams being charted by the sports charting system. These real-time statistics are generated by the user input of ball locations and the player locations of each point. From this data the sports charting system determines the statistics. Some of the statistics generated and displayed by the sports charting system relate to the serving efficiency of a player. Some of these statistics are first serve percentage **522**, second serve percentage **524**, aces **526** and double faults **526**. The sports charting system captures double faults by determining the ball location inputted by the user. If the user inputs a first serve outside the service square in the tennis court display **406**, the sports charting system will display an "X" for that first fault serve. If the server then serves a second serve the user will input the location of the second fault serve and the sports charting system will display an "X" for that second fault serve and will automatically score the second fault serve as a double fault and automatically adjust the score of the match according to the rules of tennis.

[0076] Serve related statistics for a player are generated and displayed by the sports charting system. Among these statistics are point winning percentage on first serves **530** and point winning percentage on second serves **532**. Return related statistics for a player are generated and displayed by the sports charting system. Among these statistics are returns **534** and winning percentage on returns **536**. Side shot hit on statistics for a player are generated and displayed by the sports charting system. Among these statistics are forehand winners **538**, forehand unforced errors **540**, backhand winners **542** and backhand unforced errors **544**. Statistics OK selection **539** returns to the first serve display **430**. The sports charting system displays another player's statistics when the user inputs player statistics selection **541**. The sports charting system can scroll through these statistics by when the user inputs the statistics scroll buttons **543**.

[0077] The sports charting system captures forced and unforced errors. This is an important charting statistic as it shows whether a player's errors are being forced or are just attributable to poor or deficient techniques. Other statistics generated and displayed are break point conversions percentage **546**, at net percentage **548**, net success percentage **550**, elapsed time **552**, average point duration **554** and average hits per point **556**. The elapsed time **552** is the total elapsed time for the match at the time of the elapsed time inquiry by the user. The average point duration **554** is the elapsed time for each point.

[0078] **FIG. 20** is an illustration of the scoreboard display **570**. Among the data displayed on the scoreboard display **570** are the first set score **580**, second set score **582**, player **578**, set score **576**, game score **574** and point score **572**. **FIGS. 21 and 22** are illustrations of the adjust score display **601**. Among the scores that can be adjusted by the user include a first player set adjust score **602**, a second player set adjust score **604**, a first player game adjust score **606** and a second player game adjust score **608**. The user can also adjust the server and player orientation with the server adjust **610** and a player's side adjust **612**. Up/down arrows **614** allow the user to scroll through the displays that are longer than one page.

[0079] **FIG. 23** is an illustration of the main screen display menus **700**. **FIG. 24** is an illustration of the serving and playing display menus **720**. **FIG. 25** is an illustration of the matches dialog display menu **800**. **FIG. 26** is an illustration of the players dialog display menu **820**.

[0080] The sports charting system uses match controllers, set controllers, game controllers and point controllers that collectively embody the rules of tennis to generate, responsive to a user's inputted match type, the required number of points, tiebreakers, games, sets and matches without the user needing to enter this data. A match controller is responsible for playing a tennis match, by creating new sets when they are necessary, saving sets to internal persistent storage,

knowing how to keep set scores and when a match has been completed. A set controller is responsible for playing a set, by creating new games when necessary, saving games to internal persistent storage, and knowing how to keep game scores and when a set has been completed. A game controller is responsible for playing a game, by creating new points when necessary, saving points to internal persistent storage, and knowing how to keep point scores and when a game has been completed. A point controller is responsible for playing a point, by knowing about the serve, return and playing portion of a point.

[0081] **FIG. 27** is a flow chart for the sports charting system for generating the required matches, sets, games, points and serves for a tennis match. The sports charting system through a match controller **902** proceeds to the match done inquiry **904**. If the match is done, then the sports charting system exits the match play **903**. If the match is not done, then the sports charting system, through a set controller **906**, proceeds to the set done inquiry **908**. If the set is done, then the sports charting system returns to the match done inquiry **904**. If the set is not done, then the sports charting system, through a game controller **910**, proceeds to the game done **912**. If the game is done, then the sports charting system returns to the set done inquiry **908**. If the game is not done, then the sports charting system to a point controller **914**.

[0082] **FIG. 28** is a flow chart for the sports charting system for the match controller **902**. Match information **1002** is retrieved from storage by the sports charting system. The match controller **902** starts its process by proceeding to the match over inquiry **1004**. If the answer to the match over inquiry **1004** is yes, the match controller **902** proceeds to set match ending time **1006**. It then proceeds to the set match status completed **1008**. It then proceeds to save the match **1010**, and then proceeds to update current match **1012** in the matches display **271**. Then the match controller **902** proceeds to return and displays **1016** the matches screen **271**. If the answer to the match over inquiry **1004** is no, then the match controller **902** proceeds to the new/existing match inquiry **1018**. If the answer to the new/existing match inquiry **1018** is new, then the match controller **902** proceeds to the set match starting time **1020**, then the match controller **902** proceeds to the initialize match **1022**. The initialize match **1022** initializes the server and the player court positions. The match controller **902** then proceeds to the set match status in progress **1024**, then it proceeds to the save new match **1026**. If the answer to the new/existing match inquiry **1018** is "existing", then the match controller **902** proceeds to compute match **1028**. The compute match **1028** computes the server, player court positions and the scores. Both the compute match **1028** and the save new match **1026** proceed to the create new set process **1030**. The create new set process **1030** creates a new set to play and adds it to the match. Then the create new set process **1030** proceeds to the play new set process **1032**.

[0083] **FIG. 29** is a flow chart for the sports charting system for the set controller **906**. Set information **1040** is retrieved from storage by the sports charting system. The set controller **906** starts its process by proceeding to the set over inquiry **1042**. If the answer to the set over inquiry **1042** is yes, the set controller **906** proceeds to set status completed **1044**. It then proceeds to save the set **1046**, and then proceeds to return **1048** to the match controller **902**. If the answer to the set over inquiry **1042** is no, then the set controller **906** proceeds to the new/existing set inquiry **1050**. If the answer to the new/existing set inquiry **1050** is new, then the set controller **906** proceeds to the initialize set **1054**. The initialize set **1054** initializes the server and the player court positions. The set controller **906** then proceeds to the set status in progress **1056**, then it proceeds to the save new set **1058**. If the answer to the new/existing set inquiry **1050** is "existing", then the set controller **906** proceeds to compute set **1052**. The compute set **1052** computes the server and player court positions. Both the compute set **1052** and the save new set **1058** proceed to the create new game process **1060**. The create new game process **1060** creates a new set to play and adds it to the match. Then the create new game process **1060** proceeds to the play new game process **1062**.

[0084] **FIG. 30** is a flow chart for the sports charting system for the game controller **910**. Game information **1070** is retrieved from storage by the sports charting system. The game controller **910** starts its process by proceeding to the game over inquiry **1072**. If the answer to the game over inquiry **1072** is yes, the game controller **910** proceeds to game status completed **1074**. It then proceeds to save the game **1076**, and then proceeds to return **1078** to the set controller **906**. If the answer to the game over inquiry **1072** is no, then the game controller **910** proceeds to the new/existing game inquiry **1080**. If the answer to the new/existing game inquiry **1080** is new, then the game controller **910** proceeds to the initialize game **1086**. The initialize game **1086** initializes who is serving, the server's side and the deuce/add court arrangement. The game controller **910** then proceeds to the game status in progress **1088**, then it proceeds to the save new game **1090**. If the answer to the new/existing game inquiry **1080** is "existing", then the game controller **910** proceeds to compute game **1082**. The compute game **1082** computes the server and player court positions and accounts for tiebreakers. The game controller **910** then proceeds to the compute next point score **1084**. The compute next point score **1084** computes the next point's score based upon the current game score. Both the compute next point score **1084** and save new game **1090** proceed to the create new point process **1092**. Create new point process **1092** creates a new point and adds it to the game. Then the create new point process **1092** proceeds to the play new point **1094**.

[0085] **FIG. 31** is a flow chart for the sports charting system for the point controller **914**. Point information **1100** is retrieved from storage by the sports charting system. The point controller **914** starts its process by proceeding to the first/second serve inquiry **1102**. If the answer to the first/second serve inquiry **1002** is no, then the point controller **914** proceeds to the play the point flow **1104**. If the answer to the first/second serve inquiry **1002** is yes, then the point controller **914** proceeds to the serve and receive flow **1106**. Both the play the point flow **1104** and the serve and receive flow **1106** proceed to the point done inquiry **1108**. If the answer to the point done inquiry **1108** is no, then the point controller **914** proceeds to the point information **1100**. If the answer to the point done inquiry **1108** is yes, then the point controller **914** proceeds to the determine winner **1110**. The determine winner **1110** determines who won the point and sets that information into the point information **1100**. Then the point controller proceeds to the set point status completed **1112**. Then it proceeds to the win/loss-playing display **477** to obtain point details. Then it proceeds to the save point to the storage **1116**. Then the point controller **914** proceeds to the update statistics information **1118**. Then the point controller **914** proceeds to the game controller **910**.

[0086] **FIG. 32** is a flow chart for the sports charting system for the serve and receive flow **1106**. The serve and

receive flow **1106** begins at the user input serve location **1130**. Then the serve and receive flow **1106** proceeds to the user click serve location **1132**. Then the serve and receive flow **1106** proceeds to the court area serve inquiry **1134**. If the answer to the court area serve inquiry **1134** is no, then the serve and receive flow **1106** proceeds to process form control **1136**. Then it proceeds to the update point information **1138**. Then the serve and receive flow **1106** returns **1152** to the point controller **914**. If the answer to the court area serve inquiry **1134** is yes, then the serve and receive flow **1106** proceeds to the service box inquiry **1142**. If the answer to the service box inquiry **1142** is no, then the serve and receive flow **1106** proceeds to the paint "out" ball icon **1144**. Then the serve and receive flow **1106** proceeds to the second serve inquiry **1146**. If the answer to the second serve inquiry **1146** is yes, then the serve and receive flow **1106** proceeds to the update second serve **1148**. The update second serve **1142** updates the second serve point information with the ball location. Then the serve and receive flow **1106** proceeds to the double fault update **1150**. The double fault update **1150** upon user confirmation, updates the point as a double fault. Then the serve and receive flow **1106** returns **1152** to the point controller **914**. If the answer to the second serve inquiry **1146** is no, then the serve and receive flow **1106** proceeds to the update first serve **1162**. The update first serve **1162** updates the first serve point information with the ball location. The serve and receive flow **1106** then proceeds to the create second serve form controls **1164**. The create second serve form controls **1164** creates the appropriate form controls for the second serve. Then the serve and receive flow **1106** proceeds to the user input serve location **1130**. If the answer to the service box inquiry **1142** is yes, then the serve and receive flow **1106** proceeds to the paint in ball icon **1154**. Then the serve and receive flow **1106** proceeds to the user input return location **1156**. Then the serve and receive flow **1106** proceeds to the user click return location **1158**. Then the serve and receive flow **1106** proceeds to the court area return inquiry **1160**. If the answer to the court area return inquiry **1160** is no, then the serve and receive flow **1106** proceeds to process form control **1136**. If the answer to the court area return inquiry **1160** is yes, then the serve and receive flow **1106** proceeds to the update return location **1162**. The update return location **1162** updates the return location with the ball location. Then the serve and receive flow **1106** proceeds to the inside court/opponents side inquiry **1164**. The inside court/opponents side inquiry **1164** inquires as to whether the location of the ball return is inside the court and on the opponent's side. If the answer to the inside court/opponents side inquiry **1164** is yes, then the serve and receive flow **1106** proceeds to the paint ball in **1166**. The paint ball in **1166** paints the ball in and sets the point start time. Then the serve and receive flow **1106** returns **1152** to the point controller **914**. If the answer to the inside court/opponents side inquiry **1164** is no, then the serve and receive flow **1106** proceeds to the paint ball out **1168**. Then the serve and receive flow **1106** returns **1152** to the point controller **194**.

[**0087**] **FIG. 33** is a flow chart for the sports charting system for the play and point flow **1104**. The expected click is set to hitting player **1170**. Then play and point flow **1104** proceeds to the user input player location **1172**. Then the play and point flow **1104** proceeds to the user click player location **1174**. Then the play and point flow **1104** proceeds to the court area shot inquiry **1176**. If the answer to the court area shot inquiry **1176** is no, then the play and point flow **1104** proceeds to the process form control **1136**. The play and point flow **1104** then proceeds to the update point information **1138**. Then the play and point flow **1104** returns **1182** to the point controller **914**. If the answer to the court area shot inquiry **1176** is yes, then the play and point flow **1104** proceeds to the expected click inquiry **1184**. This expected click inquiry **1184** has three options: ball, hitting player and opponent. If the answer to the expected click inquiry **1184** is ball, then the play and point flow **1104** proceeds to the expected click opponent **1194**. Then the play and point flow **1104** proceeds to the set hitting player location **1196**. The set hitting player location **1196** sets the hitting player ball location and infers and sets the opponents ball location from the player location. Then the play and point flow **1104** proceeds to the ball in inquiry **1198**. If the answer to the ball in inquiry **1198** is no, then the play and point flow **1104** proceeds to the paint the ball out icon **1200**. If the answer to the ball in inquiry **1198** is yes, then the play and point flow **1104** proceeds to the paint the ball in icon **1202**. Then the play and point flow **1104** proceeds to the user input player location **1172**.

[**0088**] If the answer to the expected click inquiry **1184** is opponent, then the play and point flow **1104** proceeds to the click on opposite side of hitting player inquiry **1204**. If the answer to the click on opposite side of hitting player inquiry **1204** is yes, then the play and point flow **1104** proceeds to the set opponent location into point information **1206**. Then the play and point flow **1104** proceeds to the paint player icon for opponent **1208**. Then the play and point flow **1104** returns **1182** to the point controller **914**. If the answer to the expected click inquiry **1184** is hitting player, then the play and point flow **1104** proceeds to the expected click ball **1186**. Then the play and point flow **1104** proceeds to the set location of hitting player **1188**. The set location of hitting player **1188** sets the location of the hitting player into the point information **1100**. The play and point flow **1104** then proceeds to the set point stop time **1190**. Then the play and point flow **1104** proceeds to the paint player icon **1192**. Then the play and point flow **1104** proceeds to the user input player location **1172**.

EXAMPLE 1

[**0089**] Player Properties Input

[**0090**] A user powers on the sports charting system and selects the players selection **206**. The user then selects the new selection **218**, then the user enters a player's profile information, typically including: the first name data field **231**, last name data field **232**, age data field **233**, city data field **234** and state data field **235**. The user then enters a player's profile information in the pull-down menus such as left/right handedness menu **236**, forehand menu **237**, backhand menu **238**, typical forehand menu **241**, typical backhand menu **242** and weapon menu **244**. The user then inputs a first and a second serve for a player in the first serve menu **246** and second serve menu **248**, both of which are pull-down menus that list flat, kick or slice as selections the user can select. The user then inputs the style of play of the player like whether the player is an all-court player, a baseliner, a counter-puncher or a serve and vollyer. The user then inputs whether the player is good under pressure or not in the good under pressure menu **260** and whether the player typically comes from behind in the comes from behind menu **262**. The

user then types text into the player and team profile data in a notes section **264** regarding any observations the user has made of the player, like is the player limping, is the player's wrist weak and limp when the player hits the ball. The user then inputs the player properties OK selection **239** and the sports charting system returns to the home display **202**.

EXAMPLE 2

[**0091**] Match Properties Input

[**0092**] A user selects matches selection **204** from the home display **202** of the sports charting system. Then the user selects the new selection **276** on the match properties display **289**. The user then inputs a title of a match in the tournament field **290**. The user then inputs the round data in a round field **292**. The user then inputs the surface type in a pull-down menu that lists grass, hardcourt and clay. The user then inputs the player and the player's opponent into the player menu **298** and the opponent menu **300** which are pull-down menus that lists stored players and teams in the sports charting system that the user can select. The user then inputs the type of match that the player and opponent will be playing in a type menu **302** which is a pull-down menu that lists 3-Set, 5-Set and Pro-Set as selections the user can select. The user then inputs a whether the match will have no-add scoring and what the tiebreak requirement will be in the no-add scoring menu **304** and the tiebreaker menu **310**. The user then inputs the points in the tiebreaker in the points in tiebreaker data entry field **312** where the user inputs the number of points of the tiebreaker. The user then inputs which player or team is serving first in the serving first menu **314** and on which side the server is serving on in the starts on side menu **316**. The user then types text into the type text freeform notes **320** regarding any observations the user has made of the match and/or player. The user then inputs the match properties OK selection **305** and the sports charting system returns to the matches display **271**.

EXAMPLE 3

[**0093**] Charting a Service

[**0094**] The user inputs player properties and match properties according to Examples 1 and 2 as mentioned above. The user then starts charting a match from the matches display **271**. The user inputs the start selection **274** and the first serve display **430** is displayed. If the serve is an ace the user inputs the location of the ace in the non-serving player's court's serving box and selects the ace selection **420**. The user also notes in the service default value **414** whether the ace was a default value or a different serve. The sports charting system automatically adjusts the score of the match and the next point is ready to be charted. For example in the case of a double fault, the user inputs the first serve and the second serve location as being out. The sports charting system automatically adjusts the score of the match and the next point is ready to be charted. For example in the case where the first serve is out and the second serve is in, the user inputs the ball out location of the first serve and in location of the second serve.

EXAMPLE 4

[**0095**] Charting a Point

[**0096**] The user charts the serve as mentioned above in Example 3. Once a serve is in, the user inputs the location of the service return. If the service return is out of the court the user inputs its location and the sports charting system determines the service return is out and after the sports charting system receives stroke data regarding the errant shot, the score is automatically adjusted and the players court location is changed according to the rules of tennis prior to the beginning of the next point. If the service return is in, the sports charting system then briefly displays the location of both the in serve and the service return balls before it displays the playing screen display **449**. The user can then input the number of shots made by both players by inputting these strokes in the stroke counter **452**. The stroke counter **452** is also advanced by the use of other user input, such as the space bar or the up/down arrows of a keyboard or by a user click. If one of the players hits an errant shot out of the court, then the user inputs the errant shot player location, the errant ball location and the winning point player location. The sports charting system determines and displays the locations of the errant shot player location, the errant ball location and the winning point player location, receives winning and losing stroke data and automatically adjusts the score of the match and players court locations according to the rules of tennis. If one of the players hits a winning shot, then the user inputs the winning point player location, the winning point player ball location and the losing point player location and the sports charting system determines and displays these locations, the sports charting system then receives winning and losing shot data and automatically adjusts the score of the match and the players court location is changed according to the rules of tennis prior to the beginning of the next point.

EXAMPLE 5

[**0097**] Point and Scoring Determinations

[**0098**] **FIG. 28** illustrates in flow diagram form the sports charting system processes for determining the score of a point. In tennis, a serve signifies the beginning of a point. The sports charting system stores rules of a particular sport and uses these rules in determining the score, statistics and outcome of a particular point. The sports charting system begins the determining process by inquiring whether this is the beginning of a point. If it is the beginning of a point, then the sports charting system displays the serve/receive display **920** and proceeds to the service in inquiry **1002**. If the serve is in, the sports charting system awaits the user input of the service return in inquiry **1004**. If the service return is in, then the sports charting system awaits the user input of the service return ball location. Then the sports charting system briefly displays the service ball location and the service return ball location, and if the return is a "winner" or is out displays the playing screen win/loss display **916**. If the service return is out, the sports charting system determines, based on the stored rules of the game of tennis, that the point is over and advances the score of the server and the players court location is changed according to the rules of tennis prior to the beginning of the next point. In this example, the user inputs a first serve that is out and the sports charting system displays the out first serve by displaying an "X" on the serve/receive display **920**. Then the user inputs a second serve that is in and inputs a service return that is in. The sports charting system determines that the point is being played by comparing the ball positions of the second serve and the service return to the stored rules of the game of tennis. The sports charting system then accepts user input regarding the number of strokes hit by the players during the point and displays the number to the screen. The user then inputs a first player location and the ball location hit by the first player. If the ball location is out of the court, then the sports charting system determines that the first player is a

point losing player and that the second player is a point winning player, receives winning and losing shot data and advances the score of the point winning player and adjusts the player positions according to the rules of tennis. The sports charting system also keeps statistics regarding the location of the point winning player and point losing player during the point. If the ball location is in the court, then the sports charting system awaits the location of the second player and then makes the determination that the first player is the point winning player and the second player is a point losing player. The sports charting system also keeps statistics regarding the location of the point winning player, the point losing player and the ball.

EXAMPLE 6

[0099] Heuristically Predicting Default Values

[0100] The user charts the serve as mentioned above in Example 3. Once a serve is in, the user inputs the location of the service return. If the service return is out of the court, the user inputs its location and the sports charting system determines the service return is out, receives data about the errant shot and the score and player positions are automatically adjusted. If the service return is in, the sports charting system then briefly displays the location of both the in serve and the service return balls before it displays the playing screen display **449**. The user can then input the number of shots made by both players by inputting these strokes in the stroke counter **452**. The stroke counter **452** is also advanced by the use of other user input, such as the space bar or the up/down arrows of a keyboard or by a user click. For this example the players are both right handed and both have a forehand as a weapon. The user inputs the point winning player location **460** in the deuce court, the winning player's ball location **462** and the point losing player location **463** in the deuce court on the other side. The sports charting system heuristically predicts the default value for the winning point player and the losing point player shot side hit on selection **486** is "forehand" for both players.

[0101] Summary

[0102] The sports charting system is used for analysis of a sporting performance of a player or players. The sports charting system displays one or many sport environments. The sports charting system accepts user inputs regarding a player's position and a sport apparatus position relative to the sport environment. The sports charting system processes the real-time statistics of the sporting performance from the player's position and the sport apparatus position as entered by the user. The sports charting system then displays the player's position and the sport apparatus position relative to the sport environment and displays selected statistics data and scoring data generated from the player's position and the sport apparatus position relative to the sport environment. The sports charting system also stores the statistics data generated by the processes and from the user.

[0103] The sports charting system uses player profile information, sport performance rules, common practices and well-established facts of a particular sport to heuristically predict default values for user input.

[0104] Although there has been described what is at present considered to be the preferred embodiments of the present invention, it will be understood that the invention can be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all aspects as illustrative and not restrictive. The scope of the invention is indicated by the appended claims rather than the foregoing description.

What is claimed is:

1. A sports charting system used for analysis of at least one sporting performance of at least one player, said system comprising:

means for displaying at least one sport environment;

means for inputting a player positional data and a sport apparatus positional data relative to said sport environment; and

means for processing the real-time statistics of said at least one sporting performance from said player positional data and said sport apparatus positional data;

wherein said display means depicts said player positional data and said sport apparatus positional data relative to said sport environment and displays at least one of: selected statistics data and scoring data generated from said player positional data and said sport apparatus positional data relative to said sport environment by said means for processing.

2. The sports charting system of claim 1 further comprising:

means for storing said data generated by said means for processing and from said means for inputting.

3. The sports charting system of claim 1 wherein said means for processing is responsive to a user inputting a sport match definition, for generating the required number of sport match definition subdivisions from said sport match definition.

4. The sports charting system of claim 1 wherein said means for processing is responsive to a user inputting a sport game orientation for generating a sport environment incorporating said sport game orientation on said means for display.

5. The sports charting system of claim 2 wherein said means for processing comprises:

means, responsive to said player positional data and said sport apparatus positional data, for placement of said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

6. The sports charting system of claim 1 further comprising:

means for storing at least one player profile comprising a set of data having default values; and

means for inputting at least one player profile data, to replace at least one default value.

7. The sports charting system of claim 1 wherein said means for inputting a player positional data and a sport apparatus positional data relative to said sport environment comprises:

means, responsive to a user input, for displaying at least one player positional data relative to said sport environment corresponding to said user input.

8. The sports charting system of claim 1 wherein said means for inputting a player positional data and a sport apparatus positional data relative to said sport environment comprises:

means, responsive to a user input, for displaying at least one sport apparatus positional data relative to said sport environment corresponding to said user input.

9. The sports charting system of claim 1 wherein said means for inputting comprises:

means, responsive to a user input, for counting the number of plays in a sporting performance.

10. The sports charting system of claim 1 wherein said means for inputting comprises:

means, responsive to a user input, for inputting environmental data of said at least one sport environment.

11. The sports charting system of claim 2 wherein said means for inputting comprises:

means, responsive to a user input, for inputting play data for said match definition subdivisions.

12. The sports charting system of claim 1 wherein said means for processing comprises:

means, responsive to a user input, for generating a user selected statistics data.

13. The sports charting system of claim 1 wherein said means for processing comprises:

means for comparing said at least one player profile data with that of another at least one player profile data;

wherein said comparing means determines differences and equalities of the compared said player profile data.

14. The sports charting system of claim 1 wherein said means for storing further comprises storing tactical data.

15. The sports charting system of claim 14 wherein said means for processing comprises:

means, responsive to said player positional data, for comparing said player positional data with said tactical data;

wherein said comparing means determines the differences and equalities between said player positional data and said tactical data.

16. The sports charting system of claim 15 further comprising:

means for storing at least one sport performance rule; and

means for determining said at least one default value from at least one of: said at least one player profile, said at least one sport performance rule, said player positional data, and said tactical data.

17. The sports charting system of claim 1 wherein said means for processing comprises:

means, responsive to a user input, for editing said scoring data.

18. The sports charting system of claim 5 wherein said means for processing comprises:

means, responsive to a user input, for editing said placement of said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

19. The sports charting system of claim 1 wherein said means for processing comprises:

means, responsive to said real-time statistics, for generating tactical structure format data.

20. A method used for analysis of at least one sporting performance of at least one player, comprising the steps of:

displaying at least one sport environment;

inputting a player positional data and a sport apparatus positional data relative to said sport environment;

processing the real-time statistics of said at least one sporting performance from said player positional data and said sport apparatus positional data;

wherein said step of displaying depicts said player positional data and said sport apparatus positional data relative to said sport environment and displays at least one of: selected statistics data and scoring data generated from said player positional data and said sport apparatus positional data relative to said sport environment by said processing in real-time; and

storing said data generated by said processing and from said inputting.

21. The method of claim 20 further comprising the step of:

processing is responsive to a user inputting a sport match definition, for generating the required number of sport match definition subdivisions from said sport match definition.

22. The method of claim 20 further comprising the step of:

processing is responsive to a user inputting a sport game orientation for generating a sport environment incorporating said sport game orientation on said means for display.

23. The method of claim 21 further comprising the step of:

placing, in response to said player positional data and said sport apparatus positional data, said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

24. The method of claim 20 further comprising the steps of:

storing at least one player profile comprising a set of data having default values; and

inputting at least one player profile data, to replace at least one default value.

25. The method of claim 20 further comprising the step of:

displaying, responsive to a user input, at least one player positional data relative to said sport environment corresponding to said user input.

26. The method of claim 20 further comprising the step of:

displaying, responsive to a user input, at least one sport apparatus positional data relative to said sport environment corresponding to said user input.

27. The method of claim 20 further comprising the step of:

counting, responsive to a user input, the number of plays in a sporting performance.

28. The method of claim 20 further comprising the step of:

inputting, responsive to a user input, environmental data of said at least one sport environment.

29. The method of claim 21 further comprising the step of:

inputting, responsive to a user input, play data for said match definition subdivisions.

30. The method of claim 20 further comprising the step of:

generating, responsive to a user input, a user selected statistics data.

31. The method of claim 20 further comprising the step of:

comparing said at least one player profile data with that of another at least one player profile data;

wherein said comparing determines differences and equalities of the compared said player profile data.

32. The method of claim 20 further comprising the step of storing further comprises storing tactical data.

33. The method of claim 32 further comprising the step of comparing said player positional data with said tactical data;

wherein said comparing determines the differences and equalities between said player positional data and said tactical data.

34. The method of claim 33 further comprising the steps of:

storing at least one sport performance rule; and

determining said at least one default value from at least one of: said at least one player profile, said at least one sport performance rule, said player positional data, and said tactical data.

35. The method of claim 20 further comprising the step of:

editing, responsive to a user input, said scoring data.

36. The method of claim 23 further comprising the step of:

editing, responsive to a user input, said placement of said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

37. The method of claim 20 further comprising the step of:

generating, responsive to said real-time statistics, tactical structure format data.

38. A product that provides a sports charting system for analysis of a sporting performance of at least one person, said product comprising:

instructions for directing a processing unit to:

display at least one sport environment;

input a player positional data and a sport apparatus positional data relative to said sport environment;

process the real-time statistics of said at least one sporting performance from said player positional data and said sport apparatus positional data; wherein said display depicts said player positional data and said sport apparatus positional data relative to said sport environment and displays at least one of: selected statistics data and scoring data generated from said player positional data and said sport apparatus positional data relative to said sport environment by said processing in real-time; and

store said data generated by said processing and from said input.

39. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to process responsive to a user inputting a sport match definition, to generate the required number of sport match definition subdivisions from said sport match definition.

40. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to process responsive to a user inputting a sport game orientation for a sport environment incorporating said sport game orientation on said display.

41. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to place said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

42. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to:

store at least one player profile, comprising a set of data having default values; and

input at least one player profile data, to replace at least one default value.

43. The product of claim 38 wherein said instruction further comprise instructions for directing said processing unit to display, responsive to a user input, at least one player positional data relative to said sport environment corresponding to said user input.

44. The product of claim 38 wherein said instruction further comprise instructions for directing said processing unit to display, responsive to a user input, at least one sport apparatus positional data relative to said sport environment corresponding to said user input.

45. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to count, responsive to a user input, the number of plays in a sporting performance.

46. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to input, responsive to a user input, environmental data of said at least on sport environment.

47. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to input, responsive to a user input, play data for said match definition subdivisions.

48. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to generate, responsive to a user input, a user selected statistics data.

49. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to compare said at least one player profile data with that of another at least one player profile data;

wherein, said compare determines differences and equalities of the compared said player profile data.

50. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to store tactical data.

51. The product of claim 50 wherein said instructions further comprise instructions for directing said processing unit to compare differences and equalities between said player positional data and said tactical data.

52. The product of claim 51 wherein said instruction further comprise instructions for directing said processing unit to:

store at least one sport performance rule; and

determine said at least one default value from at least one of: said at least one player profile, said at least one sport performance rule, said player positional data, and said tactical data.

53. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to edit, responsive to a user input, said scoring data.

54. The product of claim 41 wherein said instruction further comprise instruction for directing said processing unit to edit, responsive to a user input, said placement of said at least one player on said display relative to said sport environment before the beginning of each of said sport match definition subdivisions.

55. The product of claim 38 wherein said instructions further comprise instructions for directing said processing unit to generate, responsive to said real-time statistics, tactical structure format data.

56. A method used for analysis of at least one sporting performance of at least one player, comprising the steps of:

storing at least one sport performance rule;

displaying at least one sport environment;

inputting a player positional data and a sport apparatus positional data relative to said sport environment;

retrieving said sport performance rules;

comparing said player positional data and said sport apparatus positional data relative to said sport environment with said at least one sport performance rule to determine compliance with said at least one sport performance rule;

generating, responsive to said comparing, at least one of selected statistics data and scoring data; and

displaying said at least one of selected statistics data and scoring data.

57. The method of claim 56 wherein said step of comparing comprises:

determining if said player positional data and said sport apparatus positional data relative to said sport environment equals said sport performance rule.

58. The method of claim 56 wherein said step of comparing comprises:

displaying, responsive to said user input, at least one sport apparatus positional data relative to said sport environment corresponding to said user input.

59. The method of claim 56 wherein said step of comparing comprises:

displaying, responsive to said user input, at least one player positional data relative to said sport environment corresponding to said user input.

60. A method used for charting a tennis match, comprising the steps of:

storing at least one sport performance rule;

inputting at least one player properties data and at least one match properties data;

displaying at least one sport environment;

inputting a player positional data and a ball positional data relative to said sport environment;

generating at least one of selected statistics data and scoring data; and

displaying said at least one of selected statistics data and scoring data.

61. The method of claim 60 wherein said step of displaying comprises:

generating, responsive to said at least one match properties data, the required number of tennis match definition subdivisions.

62. The method of claim 60 wherein said step of generating comprises:

comparing said player positional data and said ball positional data relative to said sport environment with said at least one sport performance rule to determine compliance with said at least one sport performance rule.

63. The method of claim 60 wherein said step of inputting comprises:

inputting a service ball positional data relative to said sport environment; and

inputting a service return ball positional data relative to said sport environment.

64. The method of claim 63 wherein said step of generating comprises:

determining, responsive to said inputting said service ball positional data and said inputting service return ball location, at least one of selected statistics data and scoring data.

65. The method of claim 60 wherein said step of inputting comprises:

inputting a first player position relative to said sport environment;

inputting a first player ball location relative to said sport environment;

inputting a second player position relative to said sport environment.

66. The method of claim 65 wherein said step of generating comprises:

setting a second player ball location equal to said first player location relative to said sport environment.

67. The method of claim 65 wherein said step of generating comprises:

determining, responsive to said inputting, at least one of selected statistics data and scoring data.

68. The method of claim 60 further including the step of:

storing said at least one of selected statistics data and scoring data.

69. A method for determining a default value comprising:

storing at least one sport performance rule;

displaying at least one sport environment;

storing at least one tactical data;

inputting a player positional data and a sport apparatus positional data relative to said sport environment;

determining said default value from at least one of: said at least one player profile, said at least one sport performance rule, said player positional data, and said tactical data.

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