

OBJECT-ORIENTED ANALYSIS AND DESIGN

2nd Homework Assignment

Due on: Sunday, March 8, 2009

Read the following detailed description describing how Janet Gibson, the Tournament Director, creates a draw. As an analyst, you will often be required to create a mental model of an entirely new system based on a previously existing pen and paper system. You will find a partially completed Use Case form in MS Word format at the course web page.

Complete the following steps:

1. Fill in missing Use Case form information from information included in the Use Case scenario.
2. Fill in the Use Case code and name (from the SRS available at course web page) in the first field of the form.
3. Write a brief (one line) use case description in the second field of the form.
4. Write three or more pre-conditions or assumptions in the sixth field of the form.
5. Write the trigger that starts the use case in the seventh field of the form.
6. Write the sub-steps for step 4 in the form. These are the steps the system performs to create the draw.
7. Finally, write one or more secondary scenarios in the tenth field of the form.

DETAILED DESCRIPTION:

Create Draw With Thirty Two Players for the Men's Wimbledon Singles Championship

After the registration deadline has passed, Janet Gibson sits down at her desk and examines all of the registration forms for the Wimbledon tennis tournament. She decides she will create the men's singles draw first because it usually has the largest number of entrants and television viewers (which affects the time and courts that matches are played on).

Janet counts through the forms and finds that 32 men have signed up for men's singles. Of the 32 men, 4 are internationally ranked (including number 1 player in the world, Trevor James). She writes these four players' names on four small scraps of paper. Then, she places the number 1 and number 3 ranked players' names in a box labeled "top of draw." She puts the number 2 and number 4 ranked players' names in a box labeled "bottom of draw."

Next, Janet writes the names of the remaining 28 unranked players on individual scraps of paper and places them in a third, unlabeled, box. Janet asks an assistant, Joe, to draw names out of this box so she can randomly divide the unranked players into the top and bottom of the draw. Joe draws the first name and puts it in the box called "top of draw," and then Joe draws the second name and puts it in the box called "bottom of draw."

Eventually there are 16 players assigned to each half of the draw (16 pieces of paper, each with a name of a player, in each of the “draw” boxes).

Now Janet focuses on creating the top half of the draw.

To create the first-round matches for the top-half of the draw, Janet draws two names at a time from the “top-of-draw” box. The first name she draws is “James, Trevor” and the second name she draws is “Asok, Kim.” These two players will play each other in the first round.

As matches are identified, they are written on a large blank draw template (see sample blank template in SRS). The first match features the number 1 player in the world, Trevor James from the United States against Kim Asok (an unranked player) from Australia. Janet writes “1 James, T (USA)” on the top of the first match line on the draw and “Kim, A (AUS)” underneath the first match line on the draw sheet.

Janet repeats the match selection for the bottom-half of the draw until the matches for the first round are documented on the draw template.

After all matches for the first round of a tournament are written on the draw template, Janet assigns the courts, times, and umpires for each match for the entire draw.

Because Janet knows there are 32 players in the first round (16 matches), she can also calculate exactly how many matches will be played throughout the entire men’s singles draw (because with each round the number of players is cut in half, so there are also half as many matches).

So, Janet thinks to herself, “there are 32 people in the first round (16 matches), so 16 people will advance to the second round (8 matches), 8 people will advance to the third round (4 matches), 4 people will advance to the fourth round (2 matches), and finally 2 people advance to the final round (1 match). So, there will be 31 matches in the entire draw.” Janet schedules all top-half matches on the first day of the tournament, August 20.

Each tournament day starts at 8:00 a.m. There 11 total courts at the Wimbledon complex. Prior to creating the draw, Janet sets aside 2 courts (Court Number 1 and Court Number 3) for men’s singles at any time during the day. (All other courts are assigned to matches in other draws). Because there are 8 matches at the top of the draw, and only two courts available for men’s singles at 8:00 a.m., Janet starts at the top of the draw and schedules the first two matches at 8:00 a.m.

The next two matches in the top half of the draw are scheduled 2.5 hours later at 10:30 a.m. The third set of matches is scheduled at 1:00 p.m. and the final two matches of the day are scheduled for 3:30 p.m.

Next, Janet assigns courts for each match for the first day of the tournament. Janet assigns the first match, because it contains the number 1 seeded player, Trevor James, to Court Number 1 because she expects a lot of fans wanting to see this match and Court Number 1 seats 2000 people. Then she assigns the second match to Court Number 3 (the only court left for singles during that time). She also assigns the third match to Court Number 3 at 10:30 a.m. because the players in the match are not well known. The fourth match for the day, however, features of a popular player and is assigned to the larger court, Court Number 1, at 10:30 a.m., and so on.

After court assignment, Janet randomly draws the names of umpires from a hat to officiate each match for that day. These umpires' names are kept secret, and written on a separate blank draw (with positions that correspond to the actual draw).

When Janet has finished assigning times, courts, and umpires for the top-half of the draw for the first round, she assigns the times, courts, and umpires for the bottom-half of the draw (whose matches will be played on alternating days), starting with first round matches on August 21).

Based on statistics of who will win matches, Janet makes the rest of the court, match time, and umpire assignments for the remainder of the draw. For example, Trevor James is the number 1 player in the world. He has played Kim Asok twice before (in previous tournaments) and won decisively both times. Based on this winning record of Trevor James, Janet can safely assume that Trevor James will also play a second round match which will require a large court (Court Number 1) again.

After all of the matches have been written on the draw, Janet calculates the amount of money given to each player for each round they reach. As players progress in the tournament, they are awarded larger cash prizes.

MatchMate, Inc. has donated \$500,000 for the men's singles draw. Janet uses the percentages in the International Tennis Federation handbook (based on a draw with 32 players), to divide the money among the second through final round:

- 30 percent of the \$500,000 (\$150,000) will be divided among the 16 players that reach the second round (each player gets \$9,375).
- 25 percent of the \$500,000 (\$125,000) will be divided among the 8 players that reach the third round (each player gets an additional \$15,625).
- 20 percent of the \$500,000 (\$100,000) will be divided among the 4 players that reach the fourth round (each player gets an additional \$25,000).

- 15 percent of the \$500,000 (\$75,000) will be divided between the two players that reach the fifth (final) round (each player gets an additional \$37,500).
- 10 percent of the \$500,000 (\$50,000) will be given to the winner.

After Janet is done writing cash prizes on the draw, she posts the draw in the club house.