

# Snakes and Ladders

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## 2 The main menu

When the game is run you will see the main menu which has four different options. If the user enters an invalid value, for example a character or a number other than 1 to 4, an error message is displayed.

```
===== Snakes and Ladders =====  
===== Menu =====  
Press 1 to load a previous game  
Press 2 to start a new game  
Press 3 to read instructions  
Press 4 to quit game  
_
```

This menu is handled by a do while loop in the main function. To break out of this loop the user must choose option four. The other options call other functions.

### 2.1 THE LOAD MENU

The load menu displays a list of all save files. The user selects which file to load by entering the corresponding number shown to the left of the file name. Once selected the game will start. If the user enters an invalid value, meaning anything other than an integer between one and six the user will be prompted to enter another value.

```
===== Load Game =====  
1> Save1.txt  
2> A.txt  
3> B.txt  
4> C.txt  
5> X.txt  
6> Y.txt  
Choose the file you want to load <Enter a number between 1 and 6>: 1  
Loading Save1.txt...
```

The filenames are stored in a file called Config.txt. This file is opened and each line is printed to the screen. If this file fails to open, for example it might not exist, or there are no saved files recorded an error message is printed and the user is returned to the main menu. If there are available saved files and the user chooses a file the contents are used to set the values for players, snakes, ladders, the number of players and whose turn it is. The save ID is also set so the user can later choose to overwrite this file later.

### 2.2 THE NEW GAME MENU

To create a new game the user must first enter the number of players that want to play. The maximum number of players is six and the minimum is two. Next the user must enter the name of each player. The game will then start.

```
===== New Game =====  
Please enter the number of players <Minimum is 2 and Maximum is 6>: 4  
Please enter the name of player 1: Joe  
Please enter the name of player 2: Nick  
Please enter the name of player 3: David  
Please enter the name of player 4: John  
Creating new game...
```

The number of players entered is used to allocate memory for the players array. The names of each player is entered by the user and the position is set to zero. The maximum length for the player name is twenty characters. If this limit is surpassed the excess characters are not saved. Multiple words are aloud.

The upper and lower positions for the snakes and ladders are then randomly generated. There are three rules for generating the snakes and ladders. The first is a snake or ladder cannot start and end on the same row, for example if the bottom of a ladder is on square 21 to 30 the top of the ladder must be on square 31 or higher. There can be only one snake or ladder per square. Finally, a snake head cannot be on square 100.

### 2.3 THE INSTRUCTIONS MENU

The instructions menu simply displays instructions on how to play the game.

```
===== Instructions =====  
Players take turns rolling a dice.  
The player moves up the board by the number they rolled.  
If the player lands at the foot of a ladder they move to the top of the ladder.  
If the player lands at the head of a snake they move to the tail of the snake.  
The first player to reach square 100 wins.  
=====
```

### 3 Playing the Game

Once you load or create a game the board configuration will appear. It will display the start and end locations of all the snakes and ladders on the board followed by the players' names and positions.

```
===== Board =====
Snake #1: Mouth Location: 75 Tail Location: 59
Ladder #1: Bottom of Ladder Location: 72 Top of Ladder Location: 96

Snake #2: Mouth Location: 97 Tail Location: 24
Ladder #2: Bottom of Ladder Location: 16 Top of Ladder Location: 45

Snake #3: Mouth Location: 36 Tail Location: 13
Ladder #3: Bottom of Ladder Location: 84 Top of Ladder Location: 95

Snake #4: Mouth Location: 92 Tail Location: 85
Ladder #4: Bottom of Ladder Location: 1 Top of Ladder Location: 57

Snake #5: Mouth Location: 51 Tail Location: 2
Ladder #5: Bottom of Ladder Location: 27 Top of Ladder Location: 48

Snake #6: Mouth Location: 83 Tail Location: 6
Ladder #6: Bottom of Ladder Location: 39 Top of Ladder Location: 67

Snake #7: Mouth Location: 99 Tail Location: 88
Ladder #7: Bottom of Ladder Location: 61 Top of Ladder Location: 93

Joe is on 0
Nick is on 0
David is on 0
John is on 0
```

This is followed by the game menu which gives the player a number of options to choose from. If the user enters an invalid option a message will appear prompting the user to enter a valid value.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
_
```

The third option will display the board configuration again.

#### 3.1 ROLLING THE DICE

When a player rolls the dice a random number will be generated and a message will appear telling the player what they rolled and what square they landed on. It will also check if that player landed on a snake or a ladder. If they did another message will appear telling the player whether they landed on a snake or a ladder and what square they move to.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
r
Joe rolled a 4 and landed on square 75
Joe landed on a snake and moves down to square 11
```

If the player exceeds square 100, the player moves back by the number of squares they have left to move. For example, if the player is originally on square 98 and rolls a three it takes two moves to get to square 100, then the player must move back one square so they will be on square 99. When a

player lands on square 100 the winner is declared and the game is permanently deleted and the user is redirected to the main menu.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
r
Joe rolled a 2 and landed on square 100

===== Joe Wins =====
===== Menu =====
Press 1 to load a previous game
Press 2 to start a new game
Press 3 to read instructions
Press 4 to quit game
```

If the player rolls a six they roll again, otherwise it's the next players turn.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
r
Joe rolled a 6 and landed on square 50

Joe rolled a 6. Roll again.
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
```

### 3.2 SAVING A GAME

If the user created a new game and choose to save the game they must first enter the name of the new file. The max length of the filename is twenty characters. If this limit is exceeded the excess character are removed. The filename supports multiple words.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
s
Enter file name <Max 20 characters>: NewGame.txt
```

If the user loaded or already saved the current game the user can choose to overwrite the current file or create a new one.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
s
Choose one of the following options:
Press 1 to overwrite the old save file
Press 2 to save as a new file
_
```

### 3.3 QUITTING A GAME

The final option quits the games and returns the user to the main menu. Before quitting the user is given the option of saving the game as shown below. If they choose to save the game the save menu will appear.

```
It's Joe's turn
Press 'r' to roll
Press 's' to save
Press 'p' to print board
Press 'q' to quit
q
Do you want to save before you quit (Y/N): aaa
Do you want to save before you quit (Y/N):
```

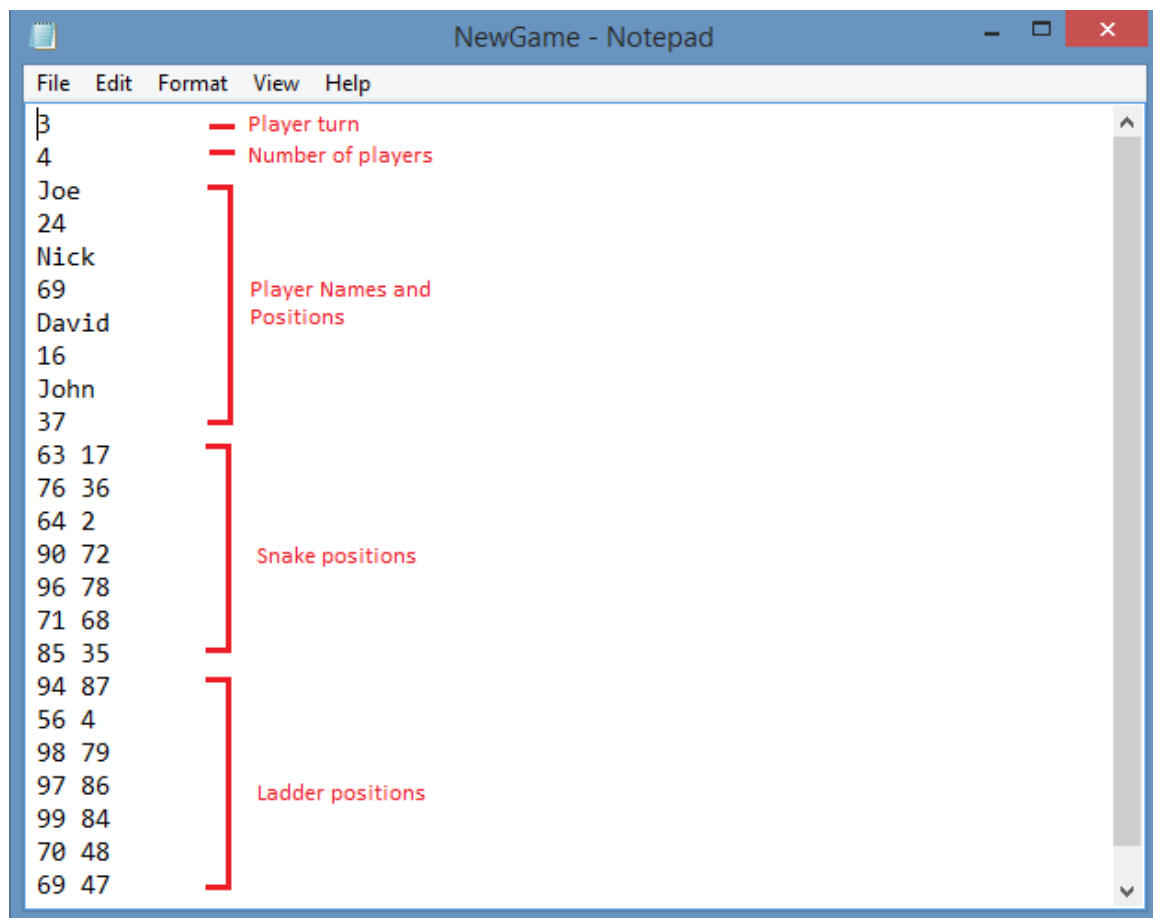
## 4 Saving Games

I chose to save games as individual files and save their names in a file called “Config.txt”. When a game is created a new file is created and the filename is appended to the end of the configuration file. When the game is won both the file and the entry in the configuration file are deleted.

### 4.1 FILE FORMAT

The first and second value in the file are always the index of the player whose turn it is and the number of players respectively. This is followed by the players’ names and positions. The number of players must be saved first as we need to know this value to read the player details in a loop.

The next seven rows store the head and tail positions for each snake. The head location is stored first followed by the tail location. The last seven rows store the ladders. The top of the ladder is stored first followed by the bottom.



### 4.2 THE SAVE ID

The save ID is an integer variable used to store the line number in the configuration file where the name of the current saved file is written. It is used to determine if a file is already open so the user can choose to overwrite it and the program can delete the file and the entry from the configuration file when the game is won. If the save ID is zero it means that the current game was not saved.