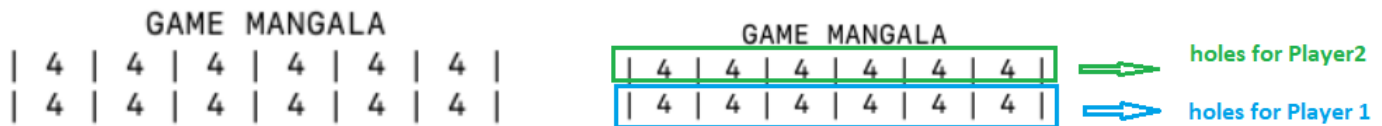


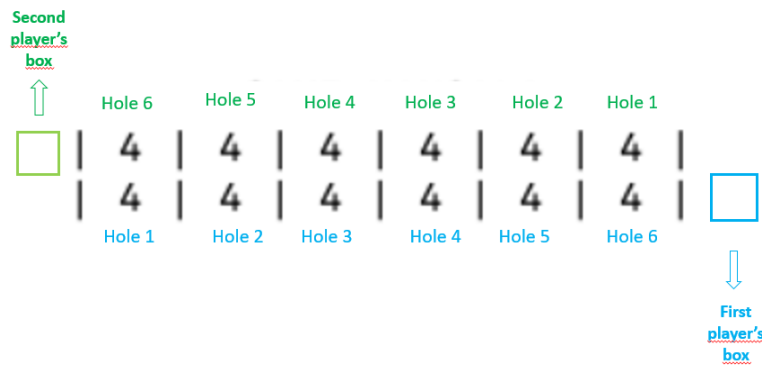
## CSE2260 - Principles of Programming Languages PROJECT I (Due 07.04.2024 23:58)

In this project, you will write a program for a **modified version** of the ancient Mangala game played with a board and 48 stones. The board contains two rows of six holes and two boxes. You will write the program in Haskell. You don't need to implement a GUI. However, you need to display the current game status after each move. You can use the console for getting input and printing the board status.

When the game starts, there are four stones in each hole. You can find the initial game board layout below. The players' positions should be as shown in the picture below and should not be changed.



How the holes are indexed for both players is shown in the image below and should not be changed.



### RULES OF THE GAME

1. The game is played with two players, a board and 48 stones.
2. The aim of the players is to collect the most stones in their boxes.
3. The player who collects the most tiles in his/her box at the end of the game wins the game.
4. The board contains twelve holes and two boxes.
5. When the game starts, there are four stones in each hole and the boxes are empty.
6. When the game starts, the program will ask the user which player will play first.
7. The first player chooses one of his/her holes and takes all the stones in this hole.
  - i. He/she puts one of the stones back into the hole and distributes the remaining stones to other holes.
  - ii. The process of distributing stones to other holes starts from the first hole on the right of the selected hole.
  - iii. Each hole on the right side is visited in order and 1 stone is added to each hole visited.
  - iv. The stone distribution process ends when the player distributes all of the stones in his/her hand.
  - v. If the last stone in the player's hand lands in the player's own box, the player plays again.

8. While the player distributes the stones he/she has chosen from a hole, after distributing one stone to each of his/her own holes on the right side, if he/she still has undistributed stones in his/her hand, he/she continues to distribute stones by distributing one stone to each of his/her opponent's holes.
9. If there is only one stone in the hole chosen by the player, he/she can place this stone in the adjacent hole on the right and the turn passes to the other player.
10. While the player is distributing the stones in his/her hand if the last stone in his/her hand is placed in an empty hole belonging to him/her, the opponent's hole on the opposite side of this hole is checked. If there are stones in the opponent's checked hole, the player takes the stones from the opponent's hole as well as the stone he/she placed in his/her own hole and puts the stones in his/her own box. The turn of the game passes to the opponent.
11. If all the stones in either player's area run out, the game ends.
12. The player who runs out of stones in his/her own area first becomes the owner of all remaining stones in his/her opponent's area. The player with the most stones in his/her box wins the game.

### SAMPLE RUN:

Select the first player: User 1

```

      GAME MANGALA
    | 4 | 4 | 4 | 4 | 4 | 4 |
    | 4 | 4 | 4 | 4 | 4 | 4 |

User 1 Enter hole number:
2
    | 4 | 4 | 4 | 4 | 4 | 4 |
    | 4 | 1 | 5 | 5 | 5 | 4 |
    → Player 1 selects the second hole and distributes the stones to the holes on the right

User 2 Enter hole number:
4
    1 | 5 | 5 | 1 | 4 | 4 | 4 |
    | 4 | 1 | 5 | 5 | 5 | 4 |
    → Player 2 selects the fourth hole and distributes the stones to the holes on the right.
User 2 Enter a new hole number:
5
    2 | 6 | 1 | 1 | 4 | 4 | 4 |
    | 5 | 2 | 5 | 5 | 5 | 4 |
    → Then, plays again since his/her last stone placed in his/her own box
    → After distributing the stones to his/her own holes, Player 2 continues to distribute the
    remaining stones in his/her hand by distributing one stone to each of his/her opponent's holes

User 1 Enter hole number:
6
    2 | 6 | 1 | 1 | 4 | 5 | 5 |
    | 5 | 2 | 5 | 5 | 5 | 1 | 1

User 2 Enter hole number:
5
    2 | 7 |   | 1 | 4 | 5 | 5 |
    | 5 | 2 | 5 | 5 | 5 | 1 | 1
    → Player 2, selects the fifth holes, and places the single stone in the hole at the sixth hole

User 1 Enter hole number:
3
    2 | 7 |   | 1 | 4 | 5 | 5 |
    | 5 | 2 | 1 | 6 | 6 | 2 | 2
    → Player 1 selects the third hole and distributes the stones to the holes on the right.
User 1 Enter a new hole number:
6
    2 | 7 |   | 1 | 4 | 5 | 5 |
    | 5 | 2 | 1 | 6 | 6 | 1 | 3
    → Then, plays again since his/her last stone placed in his/her own box
    → Player 1 plays again since his/her last stone placed in his/her own box

User 1 Enter a new hole number:
3
    2 | 7 |   | 1 | 4 | 5 | 5 |
    | 5 | 2 |   | 7 | 6 |   | 4
    → Player 1 plays again since his/her last stone placed in his/her own box

User 2 Enter hole number:
4
    5 | 7 |   |   | 4 | 5 | 5 |
    | 5 |   |   | 7 | 6 |   | 4
    → Player2, selects the fourth hole and puts the only stone in the box to the fifth hole. Since the
    fifth hole is empty before and the opposite hole of the opponent (second hole of the Player1)
    contains stones, player2 becomes the owner of the stone in his fifth hole and the stones in the
    second hole of the Player1.
  
```

```

User 1 Enter hole number:
4
 5 | 7 |   |   | 5 | 6 | 6 |
  | 5 |   |   | 1 | 7 | 1 | 5

User 2 Enter hole number:
2
 6 | 8 | 1 | 1 | 6 | 1 | 6 |
  | 5 |   |   | 1 | 7 | 1 | 5
User 2 Enter a new hole number:
6
 7 | 1 | 1 | 1 | 6 | 1 | 6 |
  | 6 | 1 | 1 | 2 | 8 | 2 | 5

User 1 Enter hole number:
6
 7 | 1 | 1 | 1 | 6 | 1 | 6 |
  | 6 | 1 | 1 | 2 | 8 | 1 | 6
User 1 Enter a new hole number:
4
 7 | 1 | 1 | 1 | 6 | 1 | 6 |
  | 6 | 1 | 1 | 1 | 9 | 1 | 6

User 2 Enter hole number:
6
 8 |   | 1 | 1 | 6 | 1 | 6 |
  | 6 | 1 | 1 | 1 | 9 | 1 | 6
User 2 Enter a new hole number:
5
15 |   |   | 1 | 6 | 1 | 6 |
   |   | 1 | 1 | 1 | 9 | 1 | 6

User 1 Enter hole number:
4
15 |   |   | 1 | 6 | 1 | 6 |
   |   | 1 | 1 |   | 10 | 1 | 6

User 2 Enter hole number:
2
15 |   |   | 1 | 7 |   | 6 |
   |   | 1 | 1 |   | 10 | 1 | 6

User 1 Enter hole number:
5
15 | 1 | 1 | 2 | 8 | 1 | 7 |
   | 1 | 1 | 1 |   | 1 | 2 | 7

```

**NOTE:** This game is not finished. It is given as an example to show all the game rules.

**At the end of the game, which player won the game and the number of stones both players have should be printed on the screen.**

## Submission Rules

1. Please put the haskell source code and the report you have written in a single zip file and submit it by uploading to canvas. **Only the group representative will upload the project. The project will be done in groups of three people.**
2. The name of the zip file should be studentnumber1\_studentnumber2\_studentnumber3.zip (ie., 150100000\_150100007\_150100015.zip).

3. In your report, provide information about the names of the functions and what they are written for and what they do. The names and student numbers of all group members should be written in the report.
4. Provide information about where and how you implemented the rules of the game.
5. Share the screenshots of the steps of the game running in your report (from the beginning to the end of the game). Explain how to run your code. The report must be in pdf format.
6. Indicate the parts of your project that are completed, missing or not working as desired.