Higher Diploma in Science in Computing
Software Development – Problem-based Learning Project [20%]

"Morra"[1] is a hand game usually played for entertainment or to settle a disagreement. The game has many variations and can be played by two or more players.

Morra Odds and Evens Variation
This variation of the game is a two-player game, where one player is going to be the "Odds" player and the other player is the "Evens" player. In each round of the game, the players will simultaneously hold out between 1 and 10 fingers. The winner of the round is decided based on the sum of fingers shown by both players, namely if the sum is an even number then the "Evens" player wins, otherwise if the sum is an odd number then the "Odds" player wins. The winner of the round receives three points. In addition, the player whose number of fingers is closer to the sum, receives two extra points.
The winner of the game is the first player who accumulates 12 points.

Develop an application to allow a user to play repeatedly the game "Morra Odds and Evens" with a computer. At the beginning of each game the user will be prompted to choose whether he/she would like to be either the "Odds" or the "Even" player. In each round of the game, the user must decide the number of fingers to show (i.e. between 1 and 10). Similarly, in each round of the game the computer will randomly pick one number between 1 and 10. In each round, the game displays the computer's choice. After each round the game displays the number of points each player has, and whether the user or the computer won the round.

A game finishes when one of the players accumulates 12 points. At the end of a game, the game displays who the winner is, and a history of the numbers of fingers shown by both the user and the computer per round.
Once a game has finished the application asks the player if he/she would like to play another game. At the end of all games, display a history of games played. The history shows, for each game, the number of rounds won and lost by the human player, and how many even and odd numbers have been chosen by each player, and the extra points received by each player per game. All the history elements of the game should be coded using _arrays._

Application Development
To solve this problem, you shall form a group of 3 people.

Project Deliverables and Submission Information
- The project will be submitted through **Moodle** on week 12. Please check Moodle for deadline.
- You need to submit only **once** per project team.
- The project submission should include a project report outlining very clearly who has coded which part of the code. The report should include a description of the input, main processing and output (IPO), and the class diagram for your application. Any decisions you take in designing and implementing your project should be specified in

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[1] https://en.wikipedia.org/wiki/Morra_(game)

the report. The report should also include a section on manual testing (describing testing scenarious and corresponding input data) you performed to show that the game is working according to the specification (here you could include screenshots of the tests performed).

- A separate submission of a short summary that outlines the tasks contributed to the project be each team member is required to be submitted by each team member.
- The code should be commented to explain what the code is doing. The code should follow good programming practice e.g. naming conventions, indentation.
- An in-class test will take place following the submission of your group project. This test will include questions based on the topic of the project and submitted application. Please check Moodle for the exact date of the in-class test.

Breakdown of marks

Table 1 presents the breakdown of marks for the Project.

Table 1 Breakdown of marks

Application	12%
Project Report	1%
In-class Test	7%