Submission Date: 28th December 2020 till 11:59 PM

FINAL PROJECT

PROGRAMMING FUNDAMENTALS (CS118) – FALL2020

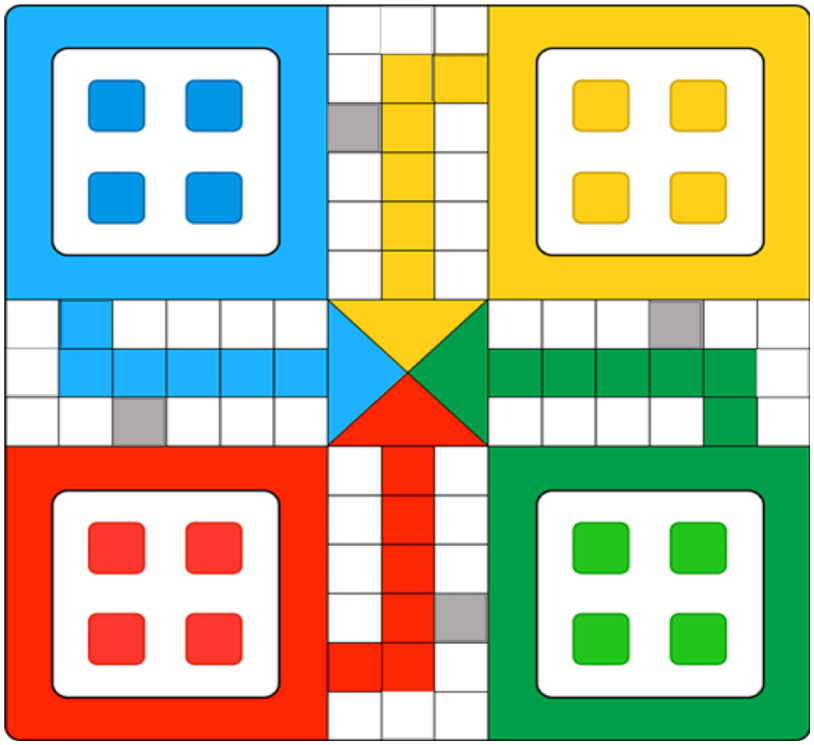
INSTRUCTIONS

1. **Plagiarism in course project will result in F grade in the course**
2. This is not a group project and each person will be working on the project individually.
3. Make sure you submit your project at least 2 hours before the submission time. Late submissions won't be accepted even if they are late by just one minute.
4. You can earn bonus marks by implementing extra features in the project.
5. Use good programming practices (well commented and indented code; meaningful variable names, readable code etc.).
6. Each file that you submit must contain your name, student-id, and assignment # on top of the file in comments.
7. Combine all your work in one folder and compress it into a zip file. The folder must contain .cpp files (no binaries, no exe files etc.).
8. Submit the solutions via google classroom. Submissions via email will not be accepted.
9. Use proper naming convention to name the file containing source code. E.g. ***i20xxxx_project.cpp*** , replace i20xxxx with your roll number.
10. Please write your name and roll number at the beginning of each program.
11. **Follow the given instructions to the letter, failing to do to so will result in a zero.**

LUDO GAME

Ludo is a strategy board game for two to four players, in which the players race their four tokens from start to finish according to the rolls of a single die.
You can learn the basics of the game by watching the video below:
https://www.youtube.com/watch?v=IHkRjn8XVtw
In this project, you have to make console-based Ludo game of 4 players with the following features:

a) User will be given the choice to select the number of players.
b) All player will enter their names.
c) Each player will be assigned a color (Red, Blue, Green, Yellow). An option will be shown on screen of either assigning the color randomly or users can select the colors themselves.
d) Draw Board on the screen. A sample board is attached below but you are free to be more creative and make as beautiful board as possible. Projects will be evaluated relatively, so you can earn more marks by designing more attractive board.



e) Each player will have 4 Ludo pieces of that color placed in the corresponding starting squares.
f) At the start, all the players will roll the dice by using ***Space*bar** key and player with highest roll takes first turn. You need to display the dice after each turn.
g) All players will take turn in clockwise order.
h) A player must throw a 6 to move a piece from the starting square onto the first square on the track.

i) A player will keep on throwing the dice if Six comes.
j) Three consecutive sixes will result in loss of turn and all his numbers in that turn will be discarded.
k) You must store the state of each player and update the board after each turn.
l) Each throw, the player should decide which piece to move. A piece simply moves in a clockwise direction around the track given by the number thrown. If no piece can legally move according to the number thrown, play should pass to the next player.
m) If a piece lands on a piece of a different color, the piece jumped upon is returned to its starting circle.
n) If a piece lands upon a piece of the same color, this forms a block. This block cannot be passed or landed on by any opposing piece.
o) When a piece has circumnavigated the board, it proceeds up the home column. A piece can only be moved onto the home triangle by an exact throw.
p) A player should not be allowed to enter into his Home column until he has removed at least one opposing piece.
q) The first person to move all 4 pieces into the home triangle wins.
r) You should also record and display the total scores of each player in a game.
    - A score of +1 must be added to the total scores of a player for crossing each square. E.g. If a player rolls a dice and gets 4 then 4 scores should be added to his total scores
    - A score of +2 should added if a player creates a block
    - A score of +10 should be added if he removes the token of an opponent
    - A score of +15 should be added if moves a piece into his home column
s) When the game starts, a user should be given the choice in the menu to view the leaderboard (displaying top 10 scores along with player names). The high-scores and player names should be read from the file (named highscores.txt) on the hard-disk and stored in the arrays of size 10. If the score of the current game makes to the list of high-scores, the lowest score is removed from the array and the new contents of the array overwrite the file.

Bonus Feature:

Players should be able make teams and play with each other. Rest of the rules should be the same except the ones given below:

a) If the pieces of different members of a team land on each other then that will create a block. This block cannot be passed or landed on by any opposing piece.
b) A team will only win when all the 8 pieces of both members move into home triangles.
c) If one member of a team successfully moves all his 4 pieces into the home triangle then he should be able to share his roll and move the pieces of his partner. He should start sharing after throwing a Six.

You may think of other interesting (and programmatically challenging) features to implement to get bonus marks. The decision to give the bonus marks for that feature

will be with the teacher so you should discuss any idea with your respective teachers to know whether it qualifies as bonus or not.

Starter Code:
We have provided you the starter code in C++ to draw circle, square and triangles of different colors and sizes. You are allowed to change it and add functionality according to the project statement.
To execute the starter code, you need to do the following:

a) Extract the attached zip file.
b) Open the terminal and navigate to the path of extracted directory
c) Install the required libraries by executing the command below:
   bash install-libraries.sh
d) Compile the project by writing the command
   make
e) Run the main file
   ./game

<u>Important Note</u>:
You must use all the concepts that have been thought to you in the course.

Happy CODING ☺