**Initiation Phase/Project Charter**

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**Project Description**

Our task with this assignment is to code a GUI-based game of Connect 4 with various options for gameplay, and one of which is Player vs Player **or** Player vs AI. Other tasks includes writing about the components relative to Project Management, showing how we used it throughout the five stages in the development of our game.We are to divide up the workload as evenly as possible amongst our group members and ensure that everyone is contributing effort into this assignment.

**Project Scope**

Create a connect four game that gives the player the option to play against another player or an AI of varying difficulty.

**Measurable Goals**

* Create a code for a Connect 4 Game that meets all the requirements stated on the rubric provided at the beginning of the project
* Be able to use the Project Management processes in order to assist in the success of our project
* Meet the set due dates for certain tasks assigned within this project
* Be able to communicate effectively with other group members in order to ensure that all members are well informed as to the tasks in which they are to work on
* Collaborate with one another to work towards the successfulness of our coded game
* Add additional features to our coded Connect 4 Game to enrich the quality of the experience the users have

**Project Requirements**

In general, to achieve success in this project, the following requirements for our program must be met:

* detailed comments describing what each part of the program does
* proper formatting (indented correctly)
* must be in GUI format
* functioning variables
* must be easy to understand
* error free
* highly efficient (no redundant code)

**Task List (No Specific Order):**

The following tasks are to be coded

Player vs Player

Player vs AI

* Easy Mode
* Medium Mode
* Hard Mode

6 \* 7 Grid

* 6 Rows
* 7 Columns

Two Different Pieces

* Either preset pieces to red and yellow or allow them to choose the colour
* Pieces will be o’s or we simply colour in the position of the grid

Allow Players to Enter their names

* Will replace the preset player 1 and player 2

Instructions Screen

Winning Message

* For rounds
* For game overall (if point limit was selected)

Counters for Points

* Max of 1 point per round
* Min of 0 points per round

Coin Flip to See Goes First

* One player will choose heads or tails
* Other player will automatically get the side that they didn’t choose
* Winner of coin toss will whether they will go 1st or 2nd
* Same thing goes for AI, if AI wins coin flip it will randomly generate a number between 1 and 2 to decide whether it will go 1st or 2nd

Checking Win Condition

* Begin checking after the player that went first, begins their 4th turn
* Check diagonal, horizontal, vertical

Placement of Pieces

* Users enter column number of which they would like to place a piece
* The piece will automatically go to the first unoccupied position of the column from the bottom up (use a boolean for the entire grid, set everything to false, when a piece is placed set equal to true)
* Check for first unoccupied spot of a column by using a reverse for loop that checks bottom up

Error messages

* Entry of invalid value heads/tails option for coin flip
* Entry of invalid column number
* Out of bounds, when user tries to place a piece in a column that is already filled up to the top
* Forces user to re-enter value

AI

* Easy

AI will place a piece randomly every 3 turns. Other turns it will calculate the best place to put a piece.

* Medium

AI will place a piece randomly every 5 turns. Other turns it will calculate the best place to put a piece.

* Hard

AI will place a piece randomly every 8 turns. Other turns it will calculate the best place to put a piece.

* Insane

AI will not place any pieces randomly, all placements will be calculated.

Switching of Turns

Checking of Score Condition

* Check 8 directions
* Top, Bottom, Top Right, Top Left, Bottom Right, Bottom Left, Right, Left
* Check in Pairs (Ex. Top Right & Bottom Left ), and if at least one is true continue checking in that direction

Other tasks include:

* Project management
* Algorithm
* Gantt Chart (recording our progress made each day)

**Deliverables:** The connect four game with all included features in the project requirements section, and proper documentation of the project management process.

**Timeline (Key Dates to Note):**

Project Given: December 21nd 2017

Project Charter Due: January 10th 2018

Algorithm and Planning Due: January 12th 2018

Monitoring and Controlling Due: December 21nd 2017 - January 18th 2018

Execution Due: January 12th 2018 - January 18th 2018

Closing Due: January 19th 2018