Software Development Project

Tic Tac Toe

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Course: Software Engineering

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# Introduction:

The goal of this project is to create a Tic Tac Toe game that one player can play against a computer or two people can play with each other. This project will have a fully intractable graphical user interface. In addition, since Tic the goal for the AI of this project is to have 3 different levels of difficulties, each level reducing the chance for the AI to make a mistake. For example in easy mode, the AI will make a mistake 50% of the time, on medium it will make a mistake 20% of the time, and on hard it will make a mistake 1% of the time.

The program should serve as a fun game that the user can play with a friend or by themselves against the computer. The program should also be stable and easy to use.

In the future this project could be expanded for other types of games and different sized boards for the Tic Tac Toe. Also adding better visual effects like animations or even 3D effects could really enhance the enjoyment of the program.

# Estimates/Plans:

Based on the previous projects and the length of time each section took me, my estimate for this project is that it will be about 650 lines of code and take approximately 18.15 hours to complete. Due to my estimates being shorter than the actual results on the last project, this time I have decided to slightly over estimate how long I believe each section will take me. Breaking up each section I have assumed that the base game design will take me about 3.35 hours to complete from the design phase to the functional testing phase. This will the largest functional component. All of the time and LOC estimates are in the Project Log.xlsx file in the Estimates Worksheet.

The flowing is the current plan to complete the project. The idea is that by each day the following item will be complete much like a milestone.

* 10/19/2016: Requirements and High Level Design Complete.
* 10/22/2016: Starting Menu and 2 Player Game Detail Design complete.
* 10/23/2016: Victory/Defeat Screen, New Round Interaction, 1 Player Game UI and AI Logic Detail Design complete.
* 10/24/2016: Starting Menu and 2 Player Game Coding and Functional tests complete.
* 10/25/2016: Victory/Defeat Screen and New Round Interaction Coding and Functional tests complete.
* 10/29/2016: 1 Player Game UI and AI Logic Coding and Functional tests complete.
* 10/30/2016: Integration test and Retrospective analysis complete.

With this milestone path I should have an extra 3 days to complete the project if I run into any unexpected issues.

# Requirements Analysis:

This program has the following requirements:

* Written in Java using the Intellij Studio IDE.
* Have a graphical interface to show the Tic Tac Toe board.
* Allow a player to choose between playing against a computer and playing against another player.
* Keep all of the traditional rules of Tic Tac Toe.
* Show the victory statues for each player and allow them to start another game.
* Keep score until the user returns to the main menu.
* Prompted each user when it is there turn.
* Have an AI that can play with 3 different difficulty levels (If time allows, bare minimum is to place move in next available slot).

# High Level Design:

This is the high level design for the entire system. It shows how each requirement will be completed among the different modules of this project. Below is a list of all the modules and their features followed by a diagram that shows their interaction with one another.

* Module: Main Menu
  + Must be able to Start a 1 or 2 player game using two different buttons
  + Can set the difficulty level of the AI (if time allows) with checklist style button
* Module: 2 Player Game
  + Shows which player is using which character (x/o).
  + Shows who’s Turn in currently is with sometime of Highlight or arrow pointing.
  + Shows the current scores from playing consecutive matches.
  + Displays a working Tic Tac Toe Board that players can interact with it.
  + Checks for a three in a row condition or if the map is full. If either is true then it goes to the victory/defeat module
* Module: 1 Player Game
  + Shows whether the player is x’s or o’s.
  + Shows the AI’s move and prompts the player when its their turn.
  + Shows the current score between Shows the current scores from playing consecutive matches.
  + Displays a working Tic Tac Toe Board that the player can interact with.
  + Checks for a three in a row condition or if the map is full. If either is true then it goes to the victory/defeat module
* Module: AI
  + Gets called with a 1 player game after every move from the player.
  + Minimum requirement: will place in the next available position.
  + Ideal requirement to meet: 3 levels of difficulty based on a percent chance to make a mistake.
  + Returns move to game module
* Module: Victory/Defeat Screen
  + Shows whether the match ended in a draw or who won the game.
  + Prompts the player(s) if they want to return to the main menu or to start another game and tally the wins and losses.
  + Transition to the player(s) choice.



# Low Level Designs:

# Implementation:

# Testing:

# Conclusion/Project Retrospective Analysis:

# Appendices: