CSC 120 Lab 9 – Group Project

**Instructions:**

Lab 9 will be completed as a group project. In this lab, you and the other members of your group will collaborate to write an interactive Tic Tac Toe game in Python in 3 stages while saving your changes at each stage to a source code repository tool called Git.

On the Blackboard course menu, you will see a new item called “My Group”. You will use this menu item to communicate and collaborate with your group. It will be up to each group how to organize itself and divide up the work. Here are some suggestions:

1. Set up an initial group meeting and select a group leader who can coordinate the effort.
2. Review the assignment instructions (maybe even view the lab videos) together as a group.
3. Divide up the work as there are several functions/components that need to be written.
4. Once everyone has completed their part, have the group leader put it all together so that the group can perform unit testing on the finished product. (“Unit testing” is the term used in industry when development teams test their own work against different test scenarios to ensure functionality is working correctly and producing expected outputs.)

Even though you will be working as a group, each individual group member will need to make their own submission of the group’s final program to Blackboard to be graded. Along with the final program submission, each individual group member will also submit the “Self and Peer Evaluation of Group Project”. On this form, you will provide feedback on each group member’s contributions (including your own) to the overall project. This feedback is taken into account in each student’s project grade.

*NOTE: In group projects, you may have a situation where every member of the group does not contribute or participate. If you are having trouble getting certain members to communicate or contribute with the rest of the group, simply continue to move forward with members who are participating and be sure to have every participating member note in their peer evaluations which members did not participate as part of the group.*

***If you submit the project but did not participate in a group, you will receive a 0 for this assignment.***

**Project description with stages** <https://use.vg/ebMl2J>

# **Online Resources:**

Watch the f**ollowing videos for reference** and to understand how to use a distributed version control system such as **git**. Git is a tool that you use on your local machines for version control. The basic idea of version control is to help you keep track of the changes you have made to your code. In addition, it also helps you collaborate with other developers.

1. Git Basics Part 1 <https://www.youtube.com/watch?v=ek7c5Br_1Ic>
2. Git Basics Part 2 <https://www.youtube.com/watch?v=migf9ZnjWfI>
3. Git Basics Part 3 <https://www.youtube.com/watch?v=g1a6MOY1iUk>

Other resources

1. Why version control? <https://www.youtube.com/watch?v=9GKpbI1siow>
2. Git basics reference video: <https://www.youtube.com/watch?v=SWYqp7iY_Tc>

# **Questions**

# **Question 1:** Download and install Git version control on your system. **(5 points)**

***Each individual group member will need to download and install Git version control on their own computer.***

**Tip:** Watch [Git Basics Part 1](https://www.youtube.com/watch?v=ek7c5Br_1Ic) video before starting this step.

* 1. Download link: <https://git-scm.com/downloads>
  2. Verify the installation by starting a new command prompt / terminal cmd on your Windows/Mac machine and type git --version. Successful installation will show a version number.
  3. Paste a screenshot of the installation for points.

**Question 2:** Create an online account on Github. **(5 points)**

***You can complete this question as a group and have just one github account that the entire group will share (preferred option), or if that does not work then each individual group member can set up their own account (in which case each member will need to save all 3 stages of code changes to their individual github repositories).***

1. Go to Github URL <https://github.com/>
2. Use the Sign Up option if you do not have an existing account
3. Paste a screenshot showing the new account created.

## **Question 3:** Create a new repository. **(5 points)**

***Depending on what option you chose for Question 2 (group or individual account), you will create one repository to be shared by the group or each individual will create their own repository in their own account.***

1. Create a new repository in your account called CSC\_120\_Tic\_Tac\_Toe.
2. Paste a link to your repository as well as the login information for your account. (This is important! It will be the way that I will be able to access your repository and grade your submission.)

**Question 4:** Clone the repository on your local machine. **(5 points)**

***Each individual group member will need to complete this so that each member will have a copy of the repository on their own local machine.***

1. Watch [Git Basics Part 2](https://www.youtube.com/watch?v=migf9ZnjWfI) video to understand how to clone a remote repository on your local machine. Please follow Approach 2 mentioned in the video.
2. Paste a screenshot of File Explorer that shows the repository folder and contents on your local machine.

## **Question 5:** Implement Stage 1 of the Tic Tac Toe game. **(20 points)**

***For each programming portion of the assignment, you can have meetings to write the code as a group or you can use a divide-and-conquer approach where each team member is given a coding assignment. It will be up to your group how to approach this. Just make sure that, if you are using individual github accounts, make sure all individual group members do all 3 stage commits to their repositories.***

**Tip:** Watch [Git Basics Part 2](https://www.youtube.com/watch?v=migf9ZnjWfI) and [Git Basics Part 3](https://www.youtube.com/watch?v=g1a6MOY1iUk) videos for exact steps.

*Functionality to be included in your Stage 1 Git commit:*

1. Create a new Python file in your local git directory named board.py.
2. Create a new 3\*3 board to your file.

*(hint: use a list of lists with all “-” characters signifying an empty board)*

1. Add functionality to print the board.
2. Add the file to your git repo using the git add command.
3. Make a git commit on your machine and push the changes to the remote repository.

## **Question 6:** Implement Stage 2 of the Tic Tac Toe game. **(20 points)**

***For each programming portion of the assignment, you can have meetings to write the code as a group or you can use a divide-and-conquer approach where each team member is given a coding assignment. It will be up to your group how to approach this. Just make sure that, if you are using individual github accounts, make sure all individual group members do all 3 stage commits to their repositories.***

*Functionality to be included in your Stage 2 Git commit:*

1. Players 1 and 2 are able to take alternate turns placing O and X marks on the board.
2. Players should not be able to place a mark at an invalid location or at a location which is not empty on the board.
3. Make a git commit on your machine and push the changes to the remote repository.

## **Question 7:** Implement Stage 3 of the Tic Tac Toe game. **(20 points)**

***For each programming portion of the assignment, you can have meetings to write the code as a group or you can use a divide-and-conquer approach where each team member is given a coding assignment. It will be up to your group how to approach this. Just make sure that, if you are using individual github accounts, make sure all individual group members do all 3 stage commits to their repositories.***

*Functionality to be included in your Stage 3 Git commit:*

1. Add the logic for player winning, losing or a draw.
2. Make a git commit on your machine and push the changes to the remote repository.

## **Question 8:** Self and Peer Evaluation **(20 points)**

## Complete and submit Self and Peer Evaluation of Group Project form.

## Your grade for this portion will be determined by your peers’ evaluation of your contributions to, and participation, in the group.

# **What Each Individual Group Member Will Submit For Grading**

# Screenshots for Questions 1 and 2.

# Online Git Repository Link and Account Login Info for Question 3.

# *(note: I will be able to login to your Git account and view the commit history for the board.py file to see if stages 1, 2, and 3 were completed and committed separately).*

# Screenshot for Question 4.

# Copy of board.py file created in Question 5-7 (you only have to include the final copy of board.py after stages 1, 2, 3 are completed).

# Self and Peer Evaluation of Group Project form in Question 8.

# **Tips and Tricks**

1. Use small functions that do one job well. For example a **print\_board()** function that just prints the board.
2. I recommend you use other functions as well, like the following:
   1. **check\_mark()** => check if a mark can be placed on the board
   2. **place\_mark()** => places a mark on the board
   3. **check\_win ()** => check if player 1 or player 2 has won the game or not.
3. **Function Example 1: check\_mark(row, col)** => returns True/False

Takes the arguments row and col and returns a True if a mark can be placed at the row and col on the board otherwise False

1. **Function Example 2: place\_mark (row, col, player\_id)** => player\_id =1 => “X” , 2 => “O”

Takes the arguments row ,col and player\_id and places a “X” at the row, col if player\_id is 1 and a “O” if player\_id is 2

# **Extra Credit Opportunities**

***Extra Credit questions can be answered as a group, although each individual group member should submit their extra credit answers as part of their own submission.***

**Question:** Read the following article on [e-waste](https://dl.acm.org/doi/fullHtml/10.1145/3398390) **(30 points)**

Use Google Scholar (https://scholar.google.com/) to conduct research on how to recycle e-waste. Provide articles and a short summary of 3 research articles that are working to tackle the problem of e-waste. Also write a short description on how you currently dispose your electronic waste and how can you improve this.

This article has been published in the magazine Communications of the ACM. This is a great academic magazine to understand the state of the computer science field for a broader audience. Research on what ACM and IEEE is. Learning how to read scientific papers is a great step towards countering the spread of misinformation.

Article Link: https://dl.acm.org/doi/fullHtml/10.1145/3398390

## **Question:** SQLLite Database **(50 points)**

## Add a SQLite database to your project. What details would you store? For partial credit, instead of adding a database to your project, draw an ER diagram of at least 2 tables applicable to the Tic-Tac-Toe program, identifying table relationships and what data you would store in the tables.