**VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY**

**UNIVERSITY OF TECHNOLOGY**

**FACULTY OF COMPUTER SCIENCE & ENGINEERING**

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**COMPUTER ARCHITECTURE**

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Assignment Report

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**Topic**

Please design and write MIPS assembly language for implementing a text-based 5x5 board Tic-Tac-Toe game for two players with following requirements.

1. During the first turn of both players, they are not allowed to choose the central point (row 3 & column 3).

2. Any player who has 3 points in a row, column or diagonal will be the winner.

3. Players can undo 1 move before the opponent plays.

**Preface**

In this report, I would like to give clear explanations in term of my MIPS code in file “tictactoe.asm” (translated from the file “tictactoe\_Ccode.c” that I had written in this link: https://github.com/thanghoang7020202/tictactoe.git)

**Explanations**

Interface explanation:

As mentioned in topic, the interface of this code is text-based and interact in Run I/O window (as in picture E1 below).

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| Image E1: screenshot of Run I/O window in MARS 4.5. |

In order to run the program, we need to Assemble the source code in file “tictactoe.asm” and run that program. The console (or Run I/O window) would show in picture E2 and require user to choose 1 for place maker in position or 2 to undo the last move.

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| Image E2: screenshot of first appearance of the program. |

In case user select “1” and “enter”:

The very first turn always be X then O and back to X until 1 player win or draw (finish 25 moves without any line of 3 X or O including horizontal, vertical and diagonal lines). It is significant to notice that we are not allow to choose (3,3), which is a central point as mentioned in the requirement (image E3.1).

In case user select “2” and “enter”:

It is obvious that players can not undo in their first turn which mean there is no previous move. Moreover, the program only allow player to undo once in each turn before their opponent make their move as aforementioned reason (image E3.2).

Other cases:

If user enter random number or character, the system will require them to input again as in image E3.3.

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| Image E3.1: Example of user input in middle point.    Image E3.2: Example of player select 2 in their first turn.    Image E3.3: Example of user input “45” and press “enter”. |

Lastly, if someone satisfy one of all win conditions the program will print out to Run I/O as image E4.

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| Image E4: Example of X win with mark in a column from (1,1) to (1,3). |

Syntax explanation: