

VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY
UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING



COMPUTER ARCHITECTURE (CO2007)

Assignment for CC02

"Tic - Tac - Toe"

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HO CHI MINH CITY, OCTOBER 2021

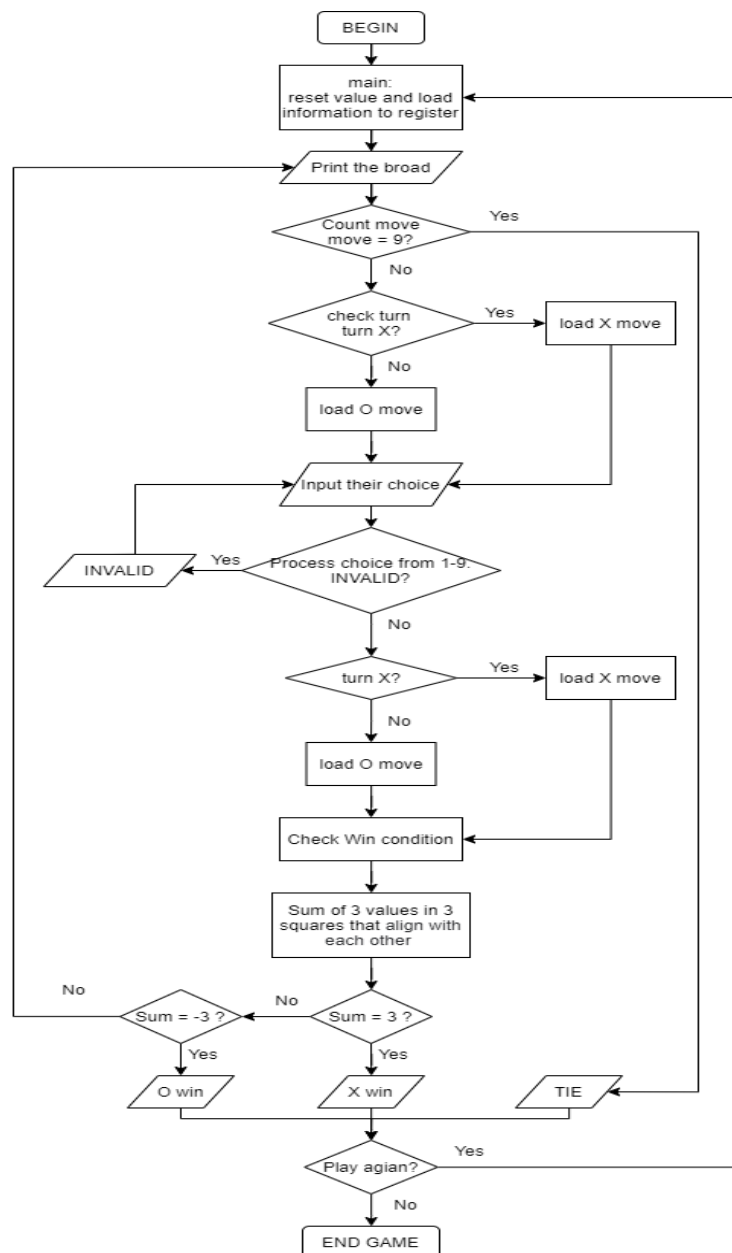
1 Links

Link to the Latex report: [HERE](#).

Link drive to the MIPS program(s)/source code (.asm files): [HERE](#).

2 Algorithms

2.1 Flowchart



2.2 Step by step

1. Begin
 2. Reset the value in the register and load the initial information to register
 3. Print the initial board to the Run I/O
 4. Count the move if move equal to 9, go to step 12
 5. Check turn of the player, X go first
 6. Request input from the player
 7. Process the input. If the input from 1 to 9 and that spot is unoccupied, go to step 8. If the input is invalid or the spot is already taken, go to step 13
 8. Each square of the board has it own counter
 - If it is X turn, the counter will hold value 1 and update the initial board.
 - If it is O turn, the counter will hold value -1 and update the initial board.
- Then go to step 9
9. Check the winning condition

	1		2		3	
	4		5		6	
	7		8		9	

- If the sum of 1, 2, 3 equal to 3, go to step 10
If the sum of 1, 2, 3 equal to -3, go to step 11
- If the sum of 4, 5, 6 equal to 3, go to step 10
If the sum of 4, 5, 6 equal to -3, go to step 11
- If the sum of 7, 8, 9 equal to 3, go to step 10
If the sum of 7, 8, 9 equal to -3, go to step 11
- If the sum of 1, 4, 7 equal to 3, go to step 10
If the sum of 1, 4, 7 equal to -3, go to step 11
- If the sum of 2, 5, 8 equal to 3, go to step 10
If the sum of 2, 5, 8 equal to -3, go to step 11
- If the sum of 3, 6, 9 equal to 3, go to step 10
If the sum of 3, 6, 9 equal to -3, go to step 11
- If the sum of 1, 5, 9 equal to 3, go to step 10
If the sum of 1, 5, 9 equal to -3, go to step 11



- If the sum of 3, 5, 7 equal to 3, go to step 10
If the sum of 3, 5, 7 equal to -3, go to step 11
 - Else go back to step 3.
10. Print "X is the Champion" to Run I/O then go to step 14
 11. Print "O is the Champion" to Run I/O then go to step 14
 12. Print "It is TIE" to Run I/O then go to step 14
 13. Request the user to re-enter and go back to step 6
 14. Ask the user if they want to play again. If not go to step 15. Else go back to step 2.
 15. End game

3 The idea in my implementation

So the main idea of my work is that I will store a string with a null terminator in the data segment. This string will represent the board of the tic tac toe game as the figure below:

Then I will assign each byte in the string in order to show the cell number for the user to play.

	1		2		3	
	4		5		6	
	7		8		9	

After that I will request the user to choose the cell to play. Each of the cell has its own register in charge. This register will hold the value which represent the status of the cell. In other word, we will determine whether the cell is occupied or not.

Then, after each loop, I will check if any user win or not. To be specific, in my code if the sum of the 3 align registers equals to 3 or -3, we have a winner. If after 9 move and the sum does not meet the condition above. The game is tie.