# I2204E – INFO216 E
Imperative Programming

Exercise I: Files (Lab question - 25 points)

1. Write a function that takes two file names corresponding to two text files as input and returns
   a. -1 if one of the files couldn't be opened;
   b. 1 if both files are identical;
   c. 0 if both files are not identical.
2. Write a main function that reads from the keyboard two file names and then calls the above function and then displays one of the following messages: *"One of the files couldn't be opened."* , *"Both files are identical."* or *"Both files are not identical."*

Exercise II: Tic-Tac-Toe (28 points)

We would like to implement the Tic-Tac-Toe grid using linked lists. Tic-tac-toe is a game for two players, 1 and 0, who take turns marking the spaces in a 3×3 grid. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row wins the game. A node is thus composed of an integer `data` field (0 for the first player, 1 for the second player or -1 for an empty node) and four pointers to a node.
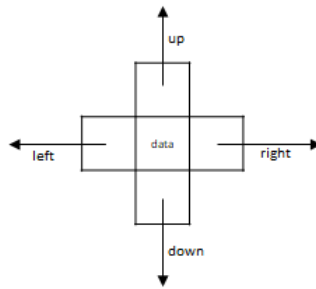
1. Give the declaration of type `node`.
2. Write a function that creates and returns a pointer to an empty `node`.
3. Using above written function, write a function that creates and returns a pointer to an <u>empty</u> 3×3 grid.
4. Write a function that takes a pointer to a 3×3 `grid` and a `player` (0 or 1) and checks whether this player won or lost the game.
5. Using above written function, write a function that checks whether there's a winner.

Exercise III: Sorting a list (25 points)

We would like to sort a singly linked list containing 0's, 1's and 2's in one traversal only!. For this, maintain three pointers `zeros`, `ones` and `twos`. Then, traverse the list from head to end and move each node to the corresponding list depending on its value. Finally, combine all three lists at the end and fix the head pointer.

1. Give the declaration of type `node`.
2. Write a function that sorts a singly linked list containing 0's, 1's and 2's in one traversal only.

Good luck!