# CO322: Data Structure and Algorithms

## Lab5: Recursive Algorithms

**Aim:** Aim of this laboratory is to use recursion to solve simple problems.

**Objective:**

- Use recursion to find the path in a Maze (Need to complete within the laboratory class)
- Use suitable data structures to solve a given a problem.
- Use Monte Carlo simulation
- Use Java threads to improve the performance (for additional marks)

This laboratory you can do in your leisure and submit what is requested.

**Deadline: 4th May 2018**

**Work:**

Use the provided skeleton code for your implementation.

**Task 1:** Need to complete this part within the laboratory class itself. Your are required to implement a function boolean *findPath* which would return true if there is a path from the given point (x,y) to other point (X, Y). You have to use recursion for this. Show your work to an instructor before leaving the laboratory class.

**Task 2:** Implement the function void showPath that would display one possible path from given point (x,y) to other point (X,Y). (Need not worry about the shortest path). You will need a suitable data structures to track the path. Also, consider the fact that you are using recursion. Of cause it goes without saying that you need to use recursion for this as well.

**Task 3:** "Suppose you have a 20x20 maze (where (0,0) and (19,19) is not blocked) probabilistically populated – each square is equally likely to be blocked or be free. What is the probability that you will have a path from (0,0) to (19,19)?". Formulate an answer for this question. Hint: Mote Carlo Simulations.

**Task 4:** Additional task for bounce marks. Use Java threads improve the performance of task 3.

**Submission:** Please submit the code for task 2 and discussion about task 3 and the code for it in a single tar file. Anything written should be PDF. Strictly no late submissions.