**BICT 225/ COMP 225 DATA STRUCTURES AND ALGORITHMS**

Assignment

1. Explain the following types of Open Addressing (8 marks)
2. Linear Probing.
3. Quadratic Probing.
4. Double Hashing.
5. Describe the Differentiate between records and arrays (4 Marks)
6. Given the following algorithm write java program to implement it (6 marks)

Algorithm Search (A, n, x) { // where A is an array, n is the size of an array and x is the item to be searched.

for i := 1 to n do

{

if(x=A[i]) then

{

write (item found at location i)

return;

}

}

write (item not found)

}

1. Define the following terms (6 marks)
   * 1. Graph.
2. Adjacent nodes.
3. Directed graph?
4. Discuss the concept of graph data structure?
5. Below is code that performs ENQUEUE and DEQUEUE operations on a Queue (Q) of elements represented by x. Rewrite the code to handle Overflow and underflow exceptions.  **(5 Marks)**

ENQUEUE(*Q, x*)

*Q* [*tail* [*Q*]]=*x*

if *tail* [*Q*] = *length* [*Q*]

then *tail* [*Q*]=1

else *tail* [*Q*]=*tail* [*Q*] + 1

DEQUEUE(*Q*)

*x* = *Q* [*head* [*Q*]]

if *head* [*Q*] = *length* [*Q*]

then *head* [*Q*]=1

else *head* [*Q*]=*head* [*Q*] + 1

return *x*

1. In computer science, a stack is a last in, first out (LIFO) abstract data type and data structure. A stack can have any abstract data type as an element, but is characterized by only two fundamental operations: push and pop. Write C++ statements to demonstrate pop operation for the following digits 0,1,2,3,4 . (7 Marks)
2. Describe the two representations a sparse matrix can be represented ? **4 Marks)**