

BSc (Hons) in Information Technology

Year 2

Data Structures and Algorithms – IT2070

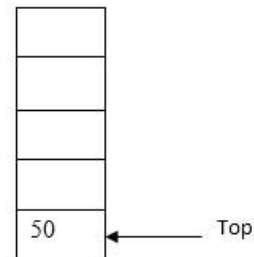
Tutorial 1 - Stacks

Question 1

a) Consider the following Stack and draw the Stack frames after executing each statement given below.

int a = 22, b = 44;

- i) theStack.push(2);
- ii) theStack.push(a);
- iii) theStack.push(a + b);
- iv) theStack.pop();
- v) theStack.push(b);
- vi) theStack.push(a - b);



Question 2

Consider the stackX class given below.

```
int top
int maxSize
int stackArr[]
```

```
StackX(int size)
void push(int no)
int pop()
boolean isEmpty()
boolean isFull()
int getCount()
```

- i) Implement isEmpty() and isFull() methods of the stack class.
- ii) Implement getCount() method to return the no of items in the stack.

Question 3

Constructor of the stack class is implemented as follows,

```
public StackX()
{
    stArr = new double[10];
    maxSize = 10;
    top = -1;
}
```

- i) Mention one disadvantage of having the above constructor.
- ii) Rewrite the constructor to avoid the disadvantage mentioned above.

Question 4

- i. A stack class has already been implemented with push() , pop() and peek() methods. It is
 - a. used to store characters. Write a code segment to insert following characters to a 'myStack' object created from the stack class.
 - b. 'g' , 't' , 'o' , 'p'
- ii. Write code segment to display all the values in a stack by removing them.
- iii. What is the result of section ii) above?

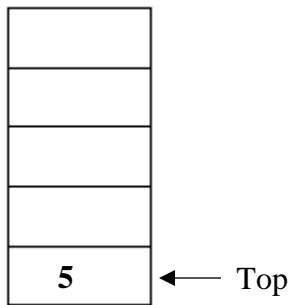
Question 5

Fill in the following blanks.

- i) Most popular data structure is _____
- ii) The process of retrieving the element at the top of a stack without removing it is called _____
- iii) A stack can be implemented using _____ or _____
- iv) In a stack, if the "top" pointer is equal -1, then the stack is _____
- v) The time complexity of the push and pop operations on a stack implementation are; push - _____ and pop - _____

Question 6

Consider the initial stack frame of a stack given below.



Below stack frames are obtained after executing three operations one after another to the above stack frame. Write down the operations.

