

**Part I Answer any 6 of the following - 5 marks each**

1. Write a function that swaps two integers. Use pass by reference.
2. Write a program to read a character from the keyboard and print the character and its corresponding ASCII value.
3. Write a function to convert a decimal number to its binary form.
4. Write a recursive function to calculate the factorial of a number.
5. Write a recursive function to find the GCD of two numbers.
6. Write a recursive function to perform depth-first-search on a binary-search-tree (BST).
7. Consider the list of numbers 2, 4, 6, 8, 10, 12, 14 from left to right, on which you perform the following
  - a. push(), push(), pop(), pop(), push(), push(), push(), pop(), push(), push(), pop(). Illustrate the stack at the end of the operations and label the top of the stack.
  - b. enqueue(), enqueue(), enqueue(), dequeue(), dequeue(), enqueue(), enqueue(), enqueue(), dequeue(), enqueue(). Illustrate the queue at the end of the operations and label the front and back of the queue.

**Part II**

8. Implement the following: **20 marks total**
  1. Define a Stack using an array. **3 marks**
  2. Define the functions push(), pop(), peek(), IsEmpty(), IsFull(). **7 marks**
  3. Write a function that uses the Stack to reverse a string. **5 marks.**
  4. Use a stack to evaluate the postfix expression. Use values  $x=2$ ,  $y=1$ ,  $z=2$ . Show all steps clearly. **5 marks**  
$$x \ 10 \ * \ y \ ^ \ 5 \ z \ * \ / \ 10 \ + \ x \ y \ + \ z \ * \ -$$