**Tutorial Sheet – ODD 2021**

**Week 4 :**

**Topic : Recursion and Recursion removal using stack, Median and Interpolation search**

Q1 ) Consider the following recursive function:

a. Identify the base case.

b. Identify the general case.

c. What valid values can be passed as parameters to the function mystery?

d. If mystery(0) is a valid call, what is its value? If not, explain why.

e. If mystery(5) is a valid call, what is its value? If not, explain why.

f. If mystery(-3) is a valid call, what is its value? If not, explain why.

2) Write a recursive algorithm to multiply two positive integers m and n using

repeated addition. Specify the base case and the recursive case.

3) Given a sorted array with possibly duplicate elements,rite an efficient code to find the first and last position of the repeated element in the array. If element is found then code should return the index. If element not found then code should -1,-1;

For example:

**Example 1:**

**Array A= [5, 7, 7, 8, 8, 10] Key= 8 Output= [3, 4]**

**Array A= [5, 7, 7, 8, 8, 10] Key= 6 Output= [-1, -1]**

**4)** Apply the median search on the following array to find the 4th smallest element. Clearly show the split array elements in each steps. Find the 4th median.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 67 | 12 | 45 | 8 | 9 | 10 | 6 | 21 | 4 |

5) write a recursive function to insert a node at the linked list. Also convert this function to non-recursive version using stacks.