# Practice problems

# Linked list

**1. Given a single linked list. 11->2->4->5->1. What is start->next->next->next->data**

**2. What is the output? Assume your own initial data in the linked list/stack/queue**

```
void fun(struct node * start){
    if (start == NULL)
        return;
    fun(start->next->next);
    printf("%d   ", start ->data);
}
```

# Linked list

```
3. void fun(struct node * start){
    if (start == NULL)
        return;
    printf("%d   ", start ->data);
    if(start ->next !=NULL)
        fun(start->next->next);
    printf("%d   ", start ->data);
}
```

# Stacks and queues

```
4. void fun(Queue *Q)
{    Stack S;  // an empty stack S
      while (!isEmpty(Q))
     {    push(&S, deQueue(Q));    }
        while (!isEmpty(&S))
     {      // Pop an item from S and enqueue the popped item to Q
       enQueue(Q, pop(&S));
     }
}
```

# GATE questions

1. **2016** : Consider the operator precedence and associativity rules for the integer arithmetic operators given in the table below. Evaluate the postfix expression 10 5 + 60 6 / * 8 -.

2. **2015** : A queue is implemented using an array such that ENQUEUE and DEQUEUE operations are performed efficiently. What is the complexity of insertion and deletion?

3. **2012**: Suppose a circular queue of capacity (n – 1) elements is implemented with an array of n elements. Assume that the insertion and deletion operations are performed efficiently. What is the time complexity of these operations?

4. **2005**: A function f defined on stacks of integers satisfies the following properties: f(∅) = 0 and f(push(S, i)) = max(f(S), 0) + i for all stacks S and integers i. What is the value of f(S[1,2,3]).?

# GATE 2024

- **Consider the following C program. Assume parameters to a function are evaluated from right to left.**

```
#include <stdio.h>
int g(int p)
{ printf("%d", p); return p;}
int h(int q)
 { printf("%d", q); return q;}
void f(int x, int y)
 {g(x);h(y);}
int main() {f(g(10),h(20));}
```

Which one of the following options is the CORRECT output of the above C program?

(A)20101020(B)10202010(C)20102010(D)10201020

# GATE 2024

- **Consider the following C function definition.**

```
int fX(char *a)
{char *b = a;
while(*b)b++;
return b -a;}
```

Which of the following statements is/are TRUE?

(A)The function call fX(”abcd”)will always return a value

(B)Assuming a character array c is declared as char c[]= ”abcd”in main(), the function call fX(c)will always return a value

(C) The code of the function will not compile

(D)Assuming a character pointer c is declared as char *c = ”abcd”in main(), the function call fX(c)will always return a value

# GATE 2024

- Let $A$be an array containing integer values. The distance of $A$ is defined as the minimum number of elements in $A$ that must be replaced with another integer so that the resulting array is sorted in non-decreasing order. The distance of the array [2,5,3,1,4,2,6]is _____

# GATE 2024

**What is the output of the following C program?**

- #include <stdio.h>
- int main()
- {double a[2]={20.0, 25.0}, *p, *q;
- p = a;
- q = p + 1;
- printf(”%d,%d”, (int)(q –p), (int)(*q –*p));return 0;}

(A)4,8(B) 1,5(C)8,5(D)1,8

# GATE 2024

- **Let S1and S2 be two stacks. S1 has capacity of 4 elements. S2 has capacity of 2 elements. S1already has 4 elements: 100, 200, 300, and 400, whereas S2 is empty,as shown below** 400 (Top)300200100Stack S1Stack S2
- Only the following three operations are available:
- PushToS2: Popthe top element from S1and push it on S2.
- PushToS1: Popthe top element from S2and pushit on S1.
- GenerateOutput: Popthe top element from S1and output it to the user.
- Which of the following output sequences can be generated by using the above operations? (A)100, 200, 400, 300(B)200, 300, 400, 100(C)400, 200, 100, 300(D)300, 200, 400, 100