Group A Questions

Core Programming

1. Print the following message in the console: "Code Olympiad 2081\n".
2. Test if a given number is an Armstrong number.
3. Write a program to swap two character variables without using a third variable.
4. You are given an array containing n-1 integers where each integer is in the range 1 to n. Find the missing number.
5. Rearrange an array such that the maximum element is followed by the minimum element, then the second maximum, and so on.
6. Given an array of size N, rotate the array to the right by K positions.
7. Write a program to check if a given array is sorted in non-decreasing order.
8. Write a program to print all factors of a given number.
9. Sort an array containing only 0s, 1s, and 2s without using a sorting algorithm.
10. Write a program to move all zeroes in an array to the end while maintaining the relative order of non-zero elements.

Writing

1. Write an Algorithm to Delete an element from Queue (Dequeue).
2. Prove by mathematical induction that : 1 + 3 + 5 + ... + (2n-1) = n^2.
3. How many numbers must be selected from the {1,3,5,7,9,11,13,15} to generate that at least one pair of these numbers add upto 16 ? Solve using pigeonhole principle.
4. Write down Algorithm for Binary Search.
5. Sort the following element using Insertion Sort. A = {4,3,1,10,2,16,8}
6. In a lottery there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?
7. Let A = {1,2} , B = {3,4,5} . Construct A x B and B x A.
8. Find the adjacency matrix to represent the directed graph shown in figure where vertices are ordered as V1 = X , V2 = Y , V3 = Z and V4 = W .

Output

```c
#include <stdio.h>
int main()
{
    int a = 5;
    printf("%d ", a++);
    printf("%d\n", ++a);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int a = 5;
    printf("%d %d %d\n", a++, ++a, a++);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("%d\n", sizeof('A'));
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int x = 10;
    {
        int x = 20;
        printf("%d\n", x);
    }
    printf("%d\n", x);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    char ch = 'A' + 2;
    printf("%c\n", ch);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int a = 5, b = 0;
    if (a && b++)
    {
        printf("Hello\n");
    }
    printf("%d\n", b);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int arr[] = {10, 20, 30};
    int *ptr = arr;
    printf("%d\n", *(ptr + 1));
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    printf("%d\n", printf("%d", 42));
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    char str[] = "Hello";
    printf("%c\n", str[5]);
    return 0;
}
```

```c
#include <stdio.h>
int main()
{
    int a = 5;
    if (++a == 6)
    {
        printf("True\n");
    }
    else
    {
        printf("False\n");
    }
    return 0;
}
```

Design