Group B Core

Q1)

```c
// Sum of N Natural Numbers
#include <stdio.h>
int main()
{
    system("cls");
    int num;
    printf("Enter a number: ");
    scanf("%d", &num);
    printf("Sum of first %d natural numbers is %d\n", num, num * (num + 1) / 2);

    return 0;
}
```

Test Case : Input : 10 Output : 55

Input : 25 Output : 325

Q2)

```c
Basic FizzBuzz problem
Write a program that prints numbers from 1 to N. But:

Print "Code" if the number is divisible by 3.
Print "Olympiad" if the number is divisible by 5.
Print "CodeOlympiad" if the number is divisible by both 3 and 5.
Otherwise, print the number itself.

#include <stdio.h>

int CodeOlympiad(int N)
{
    for (int i = 1; i <= N; i++)
    {
        if (i % 15 == 0) // (i%5 == 0 && i%3 == 0)
            printf("CodeOlympiad\n");
        else if (i % 3 == 0)
            printf("Code\n");
        else if (i % 5 == 0)
            printf("Olympiad\n");
        else
            printf("%d\n", i);
    }
}

int main()
{
    int N;
    printf("Enter the value of N: ");
    scanf("%d", &N);

    CodeOlympiad(N);
```

```
    return 0;
}
Test Case : Input : 20
Output :
1
2
Code
4
Olympiad
Code
7
8
Code
Olympiad
11
Code
13
14
CodeOlympiad
16
17
Code
19
Olympiad
```

Q3)

Print Alternating Elements
Write an algorithm to print every other element of an array starting from the first element.

```
#include <stdio.h>
int main()
{
    system("cls");
    int arr[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
    int n = sizeof(arr) / sizeof(arr[0]);
    for (int i = 0; i < n; i += 2)
    {
        printf("%d ", arr[i]);
    }
    return 0;
}
Test Case : Input : 4,5,6,7,8.9      Output : 4,6,8
```

Q4)

Reverse an Integer
Given an integer X, reverse its digits without converting it into a string.

Example:
Input: 1234 → Output: 4321
Input: -567 → Output: -765

```
#include <stdio.h>

int reverseInteger(int X)
{
    int reversed = 0;
```

```
    while (X != 0)
    {
        int lastDigit = X % 10;
        reversed = reversed * 10 + lastDigit;
        X = X / 10;
    }

    return reversed;
}

int main()
{
    system("cls");
    int X;
    printf("Enter an integer: ");
    scanf("%d", &X);

    int reversed = reverseInteger(X);
    printf("Reversed Integer: %d\n", reversed);

    return 0;
}
```

```
Test Cases : Input : -5678           Output : -8765
 Input : 7812            Output : 2187
```

Q5)

```
// Given a number, repeatedly sum its digits until the result is a single digit.
#include <stdio.h>

int main()
{
    system("cls");

    int num, sum;

    printf("Enter a number: ");
    scanf("%d", &num);

    do
    {
        sum = 0;
        while (num > 0)
        {
            sum += num % 10;
            num /= 10;
        }

        printf("Intermediate sum: %d\n", sum);
        num = sum;
    } while (sum > 9);

    printf("Final single-digit sum: %d\n", sum);
    return 0;
```

```
}
Eg ; for 119 first it will be 9 + 1 + 1 = 11 then 1 + 1 = 2 = single digit so stop
similarly 998
        = 9 + 9 + 8 = 26
        = 2 + 6 = 8 = single digit so stop

Test Case : Input : 1000       Output : 1
Input : 4231       Output : 1
```

Q6)

```
/*
 Replace Vowels
Write a pseudo-code to replace all vowels in a string with a * character
*/
#include <stdio.h>
#include <string.h>
int main()
{
    system("cls");
    char str[] = "abcdefghijklmnopqrstuvwxyz";
    int len = strlen(str);
    for (int i = 0; i < len; i++)
    {
        if (str[i] == 'a' || str[i] == 'e' || str[i] == 'i' || str[i] == 'o' || str[i] == 'u')
        {
            str[i] = '*';
        }
    }
    printf("%s", str);
    return 0;
}

Test Case : Input : Pooja      char = '*'         Output : P**j*
```

Q7)

```
Power of Two
Write a program to check whether a given number N is a power of two.

Example:
Input: 16 → Output: True (since2^4=16)
Input: 18 → Output: False

#include <stdio.h>

int isPowerOfTwo(int N)
{
    return (N > 0 && (N & (N - 1)) == 0);
}

int main()
{
    int N;
    printf("Enter a number: ");
    scanf("%d", &N);

    if (isPowerOfTwo(N))
```

```
        printf("True");
    else
        printf("False”);

    return 0;
}
```

Test Case : Input : 64 Output : true
Input : 60 Output : False

Q8)

```
/*
Count Positive, Negative, and Zeros
Write an algorithm to count how many positive, negative, and zero values are in a given list of
integers.
*/
#include <stdio.h>
int main()
{
    system("cls");
    int arr[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 0, -1, -2, -3, -4, -5, -6, -7, -8, -9};
    int positive = 0, negative = 0, zero = 0;
    int size = sizeof(arr) / sizeof(arr[0]);

    for (int i = 0; i < size; i++)
    {
        if (arr[i] > 0)
        {
            positive++;
        }
        else if (arr[i] < 0)
        {
            negative++;
        }
        else
        {
            zero++;
        }
    }

    printf("Positive: %d\nNegative: %d\nZero: %d\n", positive, negative, zero);
    return 0;
}
```

Test Case : Input : 1,2,3,0,0,-2,-3,-5,0 Output : Positive 3,Negative : 3, Zero : 3

Q9)

```
/* For a given string return the first non-repeating character or -1 if none.
For Pooja , p will be returned
For a given string swiss, w will be returned
For tomato , m will be returned and so on
Hard question
*/
#include <stdio.h>
#include <string.h>

#define MAX_CHAR 256
```

```c
char firstNonRepeatingChar(char *str)
{
    int freq[MAX_CHAR] = {0};

    for (int i = 0; str[i] != '\0'; i++)
    {
        freq[str[i]]++;
    }

    for (int i = 0; str[i] != '\0'; i++)
    {
        if (freq[str[i]] == 1)
        {
            return str[i];
        }
    }

    return -1;
}

int main()
{
    char str[100];

    printf("Enter a string: ");
    fgets(str, sizeof(str), stdin);

    str[strcspn(str, "\n")] = '\0';

    char result = firstNonRepeatingChar(str);
    if (result != -1)
    {
        printf("The first non-repeating character is: %c\n", result);
    }
    else
    {
        printf("No non-repeating character found.\n");
    }

    return 0;
}
```

Test Case : Input : Tomato Output : m
Input : Pooja Output : P

Q10)

```c
/*
Find Largest Digit
Write an algorithm to find the largest digit in a given number.
*/
#include <stdio.h>
int main()
{
    system("cls");
```

```c
    int num, largest = 0;

    printf("Enter a number: ");
    scanf("%d", &num);

    while (num > 0)
    {
        int digit = num % 10;
        if (digit > largest)
            largest = digit;

        num /= 10;
    }

    printf("Largest digit is %d\n", largest);
    return 0;
}
```

Test Case : Input : 42311 Output : 4
Input : 92313 Output : 9