PROGRAMMING IN C
CODING QUESTION AND SOLUTION

Taught by Md. A. Barik

Q1: Write down a program that will take two integers as input and will print the results of their addition, subtraction, multiplication and division

```c
#include <stdio.h>

int main()
{
    int n1, n2;
    printf("Please enter two integers:");
    scanf("%i%i", &n1, &n2);
    printf("Summation: %i\n", n1 + n2);
    printf("Subtraction: %i\n", n1 - n2);
    printf("Multiplication: %i\n", n1 * n2);
    printf("Division: %i", n1 / n2);
    return 0;
}
```

Q2: Converting height : Feet to Inch

```c
#include <stdio.h>

int main()
{
    float height, inch;
    printf("Enter height in feet:");
    scanf("%f", &height);
    inch = height * 12;
    printf("%f", inch);
    return 0;
}
```

Q3: Converting height : Feet to Inch

```c
#include <stdio.h>

int main()
{
    float height, feet;
    printf("Enter height in inch:");
    scanf("%f", &height);
    feet = height / 12;
    printf("%f", feet);
    return 0;
}
```

Q4: Time difference of two cities

Dhaka 11:20
Kolkata 10:50

```c
#include <stdio.h>

int main()
{
    int dhHr, dhMn, koHr, koMn;
    printf("Please enter dhHr:dhMn koHr:koMn :");
    scanf("%i:%i %i:%i", &dhHr, &dhMn, &koHr, &koMn);
    int dhTime = dhHr * 60 + dhMn;
    int koTime = koHr * 60 + koMn;
    int timeDif = dhTime - koTime;
    printf("Time difference: %i", timeDif);
    return 0;
}
```

Q5: Sonali Bank annually provides interests at a certain rate to all its clients having a saving account with the bank. Write down a program that will take initial balance and annual interest rate and will determine and print

1. Balance after one year
2. Balance after two years
3. Balance after n years

Q5(1)

```c
#include <stdio.h>

int main()
{
    int balance;
    printf("Please enter your balance:");
    scanf("%i", &balance);
    int totalBalance = balance + (balance * .1);
    printf("Balance after one year: %i", totalBalance);
    return 0;
}
```

Q5(2)

```c
#include <stdio.h>

int main()
{
    int balance;
    printf("Please enter your balance:");
    scanf("%i", &balance);
    int afterOneYear = balance + (balance * .1);
    int finalBalance = afterOneYear + (afterOneYear * .1);
    printf("Balance after one year: %i", finalBalance);
    return 0;
}
```

Q5(3)

```c
#include <stdio.h>

int main()
{
   int balance, year;
   printf("Please enter your balance and year:");
   scanf("%i%i", &balance, &year);
   for(int i=1; i<=year; i++)
   {
       balance = balance + (balance * .1);
   }
   printf("Balance after %i years is: %i", year, balance);
   return 0;
}
```

Q6: Write down a program that will take a positive fractional number x as input and will print its floor and rounded value.

```c
#include <stdio.h>

int main()
{
   float x;
   printf("Enter floating point number:");
   scanf("%f", &x);
   int floorVal = floor(x);
   int roundVal = round(x);
   printf("Floor of %f is %i\n", x, floorVal);
   printf("Rounded value of %f is %i\n", x, roundVal);
   return 0;
}
```

Q7: Write down a program that will print ASCII value of a character given as input

```c
#include <stdio.h>

int main()
{
   char ch;
   printf("Please enter a character:");
   scanf("%c", &ch);
   int ascii = (int) ch;
   printf("ASCII Value of %c is %i", ch, ascii);
   return 0;
}
```

Q8: Write down a program that will take a small letter as input and will print its previous letter

```c
#include <stdio.h>

int main(void)
{
    char ch;
    printf("Please enter a character:");
    scanf("%c", &ch);
    char prevCh = (int) ch - 1;
    printf("%c", prevCh);
    return 0;
}
```

Q9: Write down a program that will take uppercase letter as input and will convert it to lowercase letter.

```c
#include <stdio.h>

int main(void)
{
    char ch;
    printf("Please enter a uppercase letter:");
    scanf("%c", &ch);
    char lowerCh = (int) ch + 32;
    printf("%c", lowerCh);
    return 0;
}
```

Q10:Compute the straight line distance between two points in a plane.

```c
#include <stdio.h>
#include <math.h>

int main(void)
{
    float x1, y1, x2, y2, side1, side2, distance;
    printf("Please enter two points like (x1,y1) (x2,y2):");
    scanf("(%f,%f) (%f,%f)", &x1, &y1, &x2, &y2);
    side1 = x2 - x1;
    side2 = y2 - y1;
    distance = sqrt(side1*side1 + side2*side2);
    printf("%f", distance);
    return 0;
}
```

Q11: Write down a program that will take two integers as input and will print maximum of two

```c
#include <stdio.h>

int main(void)
{
    int n1, n2;
    printf("Please enter two integers:");
    scanf("%i%i", &n1, &n2);
    if(n1 > n2)
        printf("Maximum: %i", n1);
    else
        printf("Maximum: %i", n2);
    return 0;
}
```

Q12: Write down a program that will take three integers as input and will print maximum of three

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, n3;
    printf("Please enter three integers:");
    scanf("%i%i%i", &n1, &n2, &n3);
    if(n1 > n2 && n1 > n3)
        printf("Maximum: %i", n1);
    else if(n2 > n1 && n2 > n3)
        printf("Maximum: %i", n2);
    else
        printf("Maximum: %i", n3);
    return 0;
}
```

Q13: Write down a program that will take three integers as input and will print second largest

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, n3;
    printf("Please enter three integers:");
    scanf("%i%i%i", &n1, &n2, &n3);
    if(n1 > n2 && n1 > n3)
    {
        if(n2 > n3)
            printf("Second largest: %i", n2);
        else
            printf("Second largest: %i", n3);
    }
    else if(n2 > n1 && n2 > n3)
    {
        if(n1 > n3)
            printf("Second largest: %i", n1);
        else
            printf("Second largest: %i", n3);
    }
    else
    {
        if(n1 > n2)
            printf("Second largest: %i", n1);
        else
            printf("Second largest: %i", n2);
    }
    return 0;
}
```

Q14:Write down a program that calculate weekly wages for hourly employees. Number of hours worked in a week will be input to your program.

1) Regular hours 0-40 are paid at the rate of $10/hours
2) Overtime (>40 hours per week) is paid at the rate of 150% of regular hourly rate

```c
#include <stdio.h>

int main(void)
{
    int hr, wages;
    printf("Please enter working hours:");
    scanf("%i", &hr);
    if(hr <= 40)
    {
        wages = hr * 10;
    }
    else
    {
        wages = (40 * 10) + ((hr - 40) * 15);
    }
    printf("Wages: %i", wages);
    return 0;
}
```

Q15: Write down a program that will take a student mark as input and will convert into corresponding letter grade.

A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

```c
#include <stdio.h>

int main(void)
{
    int num;
    printf("Please enter number:");
    scanf("%i", &num);
    switch(num/10)
    {
        case 9:
        case 10:
            printf("A");
            break;
        case 8:
            printf("B");
            break;
        case 7:
            printf("C");
            break;
        case 6:
            printf("D");
            break;
        default:
            printf("F");
    }
    return 0;
}
```

Q16: Write down a program that will determine whether a given year as input is a leap year or not.

```c
#include <stdio.h>

int main(void)
{
    int year;
    printf("Please enter year:");
    scanf("%i", &year);
    if(year % 400 == 0)
        printf("Leap year!");
    else if(year % 100 == 0)
        printf("Not a leap year!");
    else if(year % 4 == 0)
        printf("Leap year!");
    else
        printf("Not a leap year!");
    return 0;
}
```

Q17:Determining small or capital letter

```c
#include <stdio.h>

int main(void)
{
    char letter;
    printf("Please enter a letter from English alphabet:");
    scanf("%c", &letter);
    int ascii = letter;
    if(ascii >= 65 && ascii <=90)
    {
        printf("Uppercase letter!");
    }
    else if(ascii >= 97 && ascii <= 122)
    {
        printf("Lowercase letter!");
    }
    else
    {
        printf("Invalid input!");
    }
    return 0;
}
```

Q18:Determining vowel or consonant

```c
#include <stdio.h>

int main(void)
{
    char ch;
    printf("Please enter a letter:");
    scanf("%c", &ch);
    int ascii = ch;
    if(ascii == 65 || ascii == 69 || ascii == 73 || ascii == 79 || ascii == 85)
        printf("Vowel");
    else if(ascii == 97 || ascii == 101 || ascii == 105 || ascii == 111 || ascii
== 117)
        printf("Vowel");
    else if((ascii >= 65 && ascii <= 90) || (ascii >= 97 && ascii <= 122))
        printf("Consonant");
    else
        printf("Invalid input");
    return 0;
}
```

```c
#include <stdio.h>

int main(void)
{
    char ch;
    printf("Please enter a letter:");
    scanf("%c", &ch);
    int ascii = ch;
    if(ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ascii == 'u')
        printf("Vowel");
    else if(ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
        printf("Vowel");
    else if((ascii >= 65 && ascii <= 90) || (ascii >= 97 && ascii <= 122))
        printf("Consonant");
    else
        printf("Invalid input");
    return 0;
}
```

Q19: Write down a program that will calculates the discount of Agora shop. The discount rate depends on the purchase amount and provided below-

Purchase amount	Discount rate
5000 tk or less	5%
For next 15000 tk	10%
For rest	20%

```c
#include <stdio.h>

int main(void)
{
    int amount, discount;
    printf("Please enter your purchase amount:");
    scanf("%i", &amount);
    if(amount <= 5000)
    {
        discount = amount * 0.05;
    }
    else if(amount <= 20000)
    {
        discount = (5000 * 0.05) + ((amount - 5000) * 0.1);
    }
    else
    {
        discount = (5000 * 0.05) + (15000 * 0.1) + ((amount - 20000) * 0.2);
    }
    printf("Your discount: %i", discount);
    return 0;
}
```

Q20: Finding minimum, maximum and second largest of three integers using ternary operator.

Q20(1)

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, n3;
    printf("Please enter three integers:");
    scanf("%i%i%i", &n1, &n2, &n3);
    int min = (n1<n2 && n1<n3) ? n1 : (n2<n1 && n2<n3) ? n2 : n3;
    printf("Minimum: %i", min);
    return 0;
}
```

Q20(2)

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, n3;
    printf("Please enter three integers:");
    scanf("%i%i%i", &n1, &n2, &n3);
    int max = (n1>n2 && n1>n3) ? n1 : (n2>n1 && n2>n3) ? n2 : n3;
    printf("Maximum: %i", max);
    return 0;
}
```

Q20(3)

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, n3;
    printf("Please enter three integers:");
    scanf("%i%i%i", &n1, &n2, &n3);
    int secondLargest = (n1>n2 && n1>n3) ? (n2>n3?n2:n3) : (n2>n1 && n2>n3) ? (n1
>n3?n1:n3) : (n1>n2)?n1:n2;
    printf("Second Largest: %i", secondLargest);
    return 0;
}
```

Q21: Print first n natural numbers

1) Upwards
2) Downwards

Q21(1)

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        printf("%i\n", i);
    }
    return 0;
}
```

Q21(2)

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=n; i>=1; i--)
    {
        printf("%i\n", i);
    }
    return 0;
}
```

Q22: Print odd numbers up to n

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        if(i%2==1)
            printf("%i\n", i);
    }
    return 0;
}
```

Q23: Print even numbers up to n

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        if(i%2==0)
            printf("%i\n", i);
    }
    return 0;
}
```

Q24: Print sum of first n numbers

```c
#include <stdio.h>

int main(void)
{
    int n, sum = 0;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        sum += i;
    }
    printf("Sum: %i", sum);
    return 0;
}
```

Q25: Print summation of all odd numbers up to n

```c
#include <stdio.h>

int main(void)
{
    int n, sum = 0;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        if(i%2==1)
            sum += i;
    }
    printf("Sum: %i", sum);
    return 0;
}
```

Q26: Print summation of all even numbers up to n

```c
#include <stdio.h>

int main(void)
{
    int n, sum = 0;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        if(i%2==0)
            sum += i;
    }
    printf("Sum: %i", sum);
    return 0;
}
```

Q27: Print factorial of n

```c
#include <stdio.h>

int main(void)
{
    int n, fact = 1;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        fact *= i;
    }
    printf("Fact: %i", fact);
    return 0;
}
```

Q28: Print x^n, where x and n are integers

```c
#include <stdio.h>

int main(void)
{
    int x, n, res = 1;
    printf("Please enter two integers:");
    scanf("%i%i", &x, &n);
    for(int i=1; i<=n; i++)
    {
        res *= x;
    }
    printf("X^N: %i", res);
    return 0;
}
```

Q29: Write down a program to find the summations of the following series:

1+2+3+...+ up to n

1^2 - 2^2 + 3^2+... up to n

Q29(1)

```c
#include <stdio.h>

int main(void)
{
    int n, sum = 0;
    printf("Please enter a number:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        sum += i;
    }
    printf("Sum: %i", sum);
    return 0;
}
```

Q29(2)

```c
#include <stdio.h>
#include <math.h>

int power(int, int);

int main(void)
{
    int n, res = 0;
    printf("Please enter an integers:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        if(i%2==1)
        {
            res += power(i, 2);
        }
        else{
            res -= pow(i, 2);
        }

    }
    printf("Result: %i", res);
    return 0;
}

int power(int x, int n)
{
    int res=1;
    for(int i=1; i<=n; i++)
    {
        res *= x;
    }
    return res;
}
```

Q30: Show all factors of a number

```c
#include <stdio.h>

int main(void)
{
    int num;
    printf("Please enter an integer:");
    scanf("%i", &num);
    for(int i=1; i<=num; i++)
    {
        if(num%i==0)
            printf("%i\n", i);
    }
    return 0;
}
```

Q31: Show smallest factor of a number n (except 1)

```c
#include <stdio.h>

int main(void)
{
    int num;
    printf("Please enter an integer:");
    scanf("%i", &num);
    for(int i=2; i<=num; i++)
    {
        if(num%i==0)
        {
          printf("%i\n", i);
          break;
        }
    }
    return 0;
}
```

Q32: Show larges factor of a number n (other than the number itself

```c
#include <stdio.h>

int main(void)
{
    int num;
    printf("Please enter an integer:");
    scanf("%i", &num);
    for(int i=(num-1); i>=0; i--)
    {
        if(i==0)
        {
            printf("1");
            break;
        }
        if(num%i==0)
        {
          printf("%i\n", i);
          break;
        }
    }
    return 0;
}
```

Q33: Prime number testing

```c
#include <stdio.h>

int main(void)
{
    int n, check=1;
    printf("Enter an integer:");
    scanf("%i", &n);
    for(int i=2; i<=n/2; i++)
    {

        if(n%i==0)
        {
            check=0;
            break;
        }
    }
    if(check==1 && n != 1)
        printf("Prime number!");
    else
        printf("Not a prime number!");
}
```

Q34: Perfect number testing

```c
#include <stdio.h>

int main(void)
{#include <stdio.h>

int main(void)
{
    int n, result=0;
    printf("Enter an integer:");
    scanf("%i", &n);
    for(int i=1; i<=n/2; i++)
    {
        if(n%i==0)
            result += i;
    }
    if(result == n)
        printf("Perfect number!");
    else
        printf("Not a perfect number!");
    return 0;
}
```

Q35: GCD of two numbers

```c
#include <stdio.h>

int main(void)
{
    int n1, n2, result;
    printf("Enter two integers:");
    scanf("%i%i", &n1, &n2);
    for(int i=1; i<=n1 && i<=n2; i++)
    {
        if(n1%i==0 && n2%i==0)
            result = i;
    }
    printf("%i", result);
    return 0;
}
```

Q36: Fibonacci series

```c
#include <stdio.h>

int main(void)
{
    int n, x=0, y=1, z;
    printf("Enter an integer:\n") ;
    scanf("%i", &n);
    printf("Fibonacci series:\n%i\n", y);
    for(int i=1; i<n; i++)
    {
        z = x + y;
        printf("%i\n", x+y);
        x = y;
        y = z;
    }
    return 0;
}
```

Q37: Write down a program that prints the digits of a number in reverse

```c
#include <stdio.h>

int reverse(int);

int main(void)
{
    int input;
    printf("Enter a number:");
    scanf("%i", &input);
    printf("Reversed: %i", reverse(input));
    return 0;
}

int reverse(int num)
{
    int reversed = 0, reminder;
    while(num != 0)
    {
        reminder = num % 10;
        reversed = 10 * reversed + reminder;
        num /= 10;
    }
    return reversed;
}
```

```c
#include <stdio.h>

int reverse(int);

int main(void)
{
    int input;
    printf("Enter a number:");
    scanf("%i", &input);
    printf("Reversed: %i", reverse(input));
    return 0;
}

int reverse(int num)
{
    int reversed = 0, reminder;
    while(num != 0)
    {
        reminder = num % 10;
        reversed = 10 * reversed + reminder;
        num /= 10;
    }
    return reversed;
}
```

Q38: Counting number of a digits of a number

```c
#include <stdio.h>

int main(void)
{
    int num, reminder, count=0;
    printf("Please enter an integer:");
    scanf("%i", &num);
    while(num != 0)
    {
        reminder = num % 10;
        count++;
        num /= 10;
    }
    printf("Total digits: %i", count);
    return 0;
}
```

Q39: Write a program that print all prime numbers up to x. The integer x will be input to your program

```c
#include <stdio.h>

int isPrime(int);

int main(void)
{
    int x;
    printf("Please enter an integer:");
    scanf("%i", &x);
    for(int i=2; i<=x; i++)
    {
        if(isPrime(i))
            printf("%i\n", i);
    }
    return 0;
}

int isPrime(int n)
{
    if(n <= 1)
        return 0;

    for(int i=2; i<n; i++)
    {
        if(n%i==0 && n != 2)
            return 0;
    }
    return 1;
}
```

Q40: Write a program that will take an integer x as input and will count and print the number of prime number and prime number itself up to x.

```c
#include <stdio.h>

int isPrime(int);

int main(void)
{
    int x, count=0;
    printf("Please enter an integer:");
    scanf("%i", &x);
    for(int i=2; i<=x; i++)
    {
        if(isPrime(i))
        {
            printf("%i\n", i);
            count++;
        }
    }
    printf("Total prime number up to %i is: %i", x, count);
    return 0;
}

int isPrime(int n)
{
    if(n <= 1)
        return 0;

    for(int i=2; i<n; i++)
    {
        if(n%i==0 && n != 2)
            return 0;
    }
    return 1;
}
```

Q41: Write a program that print all perfect numbers up to x. The integer x will be input to your program.

```c
#include <stdio.h>

int isPefectNumber(int);

int main(void)
{
    int x, count=0;
    printf("Please enter an integer:");
    scanf("%i", &x);
    for(int i=1; i<=x; i++)
    {
        if(isPefectNumber(i))
        {
            printf("%i\n", i);
            count++;
        }
    }
    printf("Total perfect number up to %i is: %i", x, count);
    return 0;
}

int isPefectNumber(int n)
{
    int sum = 0;
    for(int i=1; i<=n/2; i++)
    {
        if(n%i==0)
            sum += i;
    }
    if(sum == n)
        return 1;
    else
        return 0;
}
```

Q42: Write a program that print all prime factors of a number up to x and x is given as input to your program.

```c
#include <stdio.h>

int isPrime(int);

int main(void)
{
    int x, count;
    printf("Please enter an integer:");
    scanf("%i", &x);
    for(int i=2; i<=x; i++)
    {
        if(x%i==0)
        {
            if(isPrime(i))
            {
                printf("%i\n", i);
                count++;
            }
        }
    }
    printf("Total prime factors up to %i is : %i", x, count);
    return 0;
}

int isPrime(int n)
{
    if(n <= 1)
        return 0;

    for(int i=2; i<n; i++)
    {
        if(n%i==0 && n != 2)
            return 0;
    }
    return 1;
}
```

Q43: Write down a program that will take an integer n as input and will count and print the number of Fibonacci numbers up to x.

```c
#include <stdio.h>

int main(void)
{
    int n, x=0, y=1, z;
    printf("Enter an integer:");
    scanf("%i", &n);
    printf("%i\n", y);
    for(int i=1; i<n; i++)
    {
        z = x + y;
        printf("%d\n", x + y);
        x = y;
        y = z;
    }
    printf("Number of fibonacci number is: %i", n);
}
```

Q44:Write down a program that print the following. The total number of lines will be input to your program.

```
*
**
***
****
*****
```

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter an integer:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        for(int j=1; j<=i; j++)
        {
            printf("*");
        }
        printf("\n");
    }
    return 0;
}
```

Q45:Write down a program that print the following. The total number of lines will be input to your program.

```
    *
   **
  ***
 ****
*****
```

```c
#include <stdio.h>
int main(void)
{
    int n;
    printf("Please enter an integer:");
    scanf("%i", &n);
    for(int i=1; i<=n; i++)
    {
        for(int j=n; j>i; j--)
        {
            printf(" "); // Space
        }
        for(int k=0; k<i; k++)
        {
            printf("*");
        }
        printf("\n");
    }
    return 0;
}
```

Q46: Write down a program that will take N students mark as input and store them in an array. Find average mark N will also be input. (For 5 students)

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter number of the students:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter marks for student %i: \n", i+1);
        scanf("%i", &marks[i]);
    }

    float sumOfAllMarks = 0;
    for(int j=0; j<n; j++)
    {
        sumOfAllMarks = sumOfAllMarks + marks[j];
    }
    printf("Average: %.3f \n", sumOfAllMarks / n);
    return 0;
}
```

Q47: Write down a program that will take N students mark as input and store them in an array. Find the grade of each students.

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter number of the students:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter marks for student %i: \n", i+1);
        scanf("%i", &marks[i]);
    }

    printf("Corresponding grade:\n");
    for(int j=0; j<n; j++)
    {
        switch(marks[j] / 10)
        {
            case 10:
            case 9:
            case 8:
                printf("A+\n");
                break;
            case 7:
                printf("A\n");
                break;
            case 6:
                printf("A-\n");
                break;
            case 5:
                printf("B\n");
                break;
            case 4:
                printf("C\n");
                break;
            default:
                printf("F\n");
        }
    }
    return 0;
}
```

Q48: Take numbers as input and store them in an array. Print all odd numbers in the array.

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter number element:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter integer:");
        scanf("%i", &marks[i]);
    }

    printf("Odd number in the array:\n");
    for(int j=0; j<n; j++)
    {
        if(marks[j]%2 == 1)
        {
            printf("%i\n", marks[j]);
        }
    }
    return 0;
}
```

Q49: Take numbers as input and store them in an array. Find highest/lowest marks

Q49(1)

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter number of students:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter marks of student %i:", i+1);
        scanf("%i", &marks[i]);
    }
    int highest = marks[0];
    for(int j=1; j<n; j++)
    {
        if(marks[j] > highest)
            highest = marks[j];
    }
    printf("Highest: %i", highest);
    return 0;
}
```

Q49(2)

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter number of students:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter marks of student %i:", i+1);
        scanf("%i", &marks[i]);
    }
    int lowest = marks[0];
    for(int j=1; j<n; j++)
    {
        if(marks[j] < lowest)
            lowest = marks[j];
    }
    printf("Lowest: %i", lowest);
    return 0;
}
```

Q50: Write down a program that will take N numbers as input and store them in an array || for sorted or unsorted array. And find the index of the minimum number.

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter integer:");
    scanf("%i", &n);

    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter integer %i:", i+1);
        scanf("%i", &marks[i]);
    }
    int lowest = marks[0];
    int index = 0;
    for(int j=1; j<n; j++)
    {
        if(marks[j] < lowest)
        {
          lowest = marks[j];
          index = j;
        }
    }
    printf("Index of minimum number: %i", index);
    return 0;
}
```

Q51. Take N numbers as input and store them in an array. Shift all elements of the array one place towards left. The first element will go to the last place.

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Enter the array size:");
    scanf("%i", &n);
    // taking input
    int marks[n];
    for(int i=0; i<n; i++)
    {
        printf("Enter integer %i:", i+1);
        scanf("%i", &marks[i]);
    }
    // shifting
    int first = marks[0];
    for(int j=0; j<n-1; j++)
    {
        marks[j] = marks[j+1];
    }

    marks[n-1] = first;
    // printing
    for(int k=0; k<n; k++)
    {
        printf("%i", marks[k]);
    }
    return 0;
}
```

Q52. Find the index of a number(given) in an unsorted integers array with linear searching algorithm.

```c
#include <stdio.h>

int main(void)
{
    int marks[10] = {2, 4, 3, 9, 10, 8, 7, 6, 5, 12};

    int find = 6, index;
    for(int i=0; i<10; i++)
    {
        if(marks[i] == find)
        {
            index = i;
            break;
        }
    }
    printf("Index of %i is: %i", find, index);
    return 0;
}
```

Q53. Find the index of a number(given) in an integers array using binary search.

```c
#include <stdio.h>

int main(void)
{
    int marks[10] = {2, 3, 4, 5, 6, 7, 8, 9, 10, 12};
    int target = 4;
    int left = 0;
    int right = 9;
    int middle;

    while(left <= right)
    {
        middle = (left + right) / 2;
        if(marks[middle] == target)
        {
            printf("Index: %i", middle);
            break;
        }
        if(marks[middle] < target)
        {
            left = middle + 1;
        }
        if(marks[middle] > target)
        {
            right = middle - 1;
        }
    }
    if(!middle)
    {
        printf("Not found");
    }
    return 0;
}
```

Q54. Take N students marks as input and store them in array. Find and print how many of them got A, how many of them got B, C, D and F grades respectively.
The grade char is provided below:

Marks	Grade
90-100	A
80-89	B
70-79	C
60-69	D
<60	F

```c
#include <stdio.h>

int main(void)
{
    int n;
    printf("Please enter size of array:");
    scanf("%i", &n);
    int arr[n];
    for(int i=0; i<n; i++)
    {
        printf("Please enter an integer:");
        scanf("%i", &arr[i]);
    }

    int a=0, b=0, c=0, d=0, f=0;
    for(int j=0; j<n; j++)
    {
        switch(arr[j]/10)
        {
            case 10:
            case 9:
                a++;
                break;
            case 8:
                b++;
                break;
            case 7:
                c++;
                break;
            case 6:
                d++;
                break;
            default:
                f++;
        }
    }
    printf("A: %i, B: %i, C: %i, D: %i, F: %i", a, b, c, d
, f);
    return 0;
}
```

Q55. Write down a function that will take an integer as parameter and will return the reverse of the number.

```c
#include <stdio.h>

int reverse(int);

int main(void)
{
    int num;
    printf("Please enter a number:");
    scanf("%i", &num);
    int reverseNum = reverse(1234);
    printf("Reversed: %i", reverseNum);
    return 0;
}

int reverse(int n)
{
    int remainder, reversed = 0;
    while(n != 0)
    {
        remainder = n % 10;
        reversed = reversed * 10 + remainder;
        n = n / 10;
    }
    return reversed;
}
```

Q56. Write down a function that will take two integers x and y as parameter and will return x^y

```c
#include <stdio.h>

int power(int, int);

int main(void)
{
    int x, y;
    printf("Please enter x y:");
    scanf("%i%i", &x, &y);
    int res = power(x, y);
    printf("X^Y is: %i", res);
    return 0;
}

int power(int x, int y)
{
    int result = 1;
    for(int i=1; i<=y; i++)
    {
        result *= x;
    }
    return result;
}
```

Q57. Write down a function that will take an integer as parameter and will return number of digits on it.

```c
#include <stdio.h>

int totalDigit(int);

int main(void)
{
    int n;
    printf("Please enter and integer:");
    scanf("%i", &n);
    int count = totalDigit(n);
    printf("Total digit in the number : %i", count);
    return 0;
}

int totalDigit(int num)
{
    int remainder, counter = 0;
    while(num != 0)
    {
        remainder = remainder % 10;
        counter++;
        num = num / 10;
    }
    return counter;
}
```

Q58: Write down a function that will take two integers x and y as parameters and will return GCD.

```c
#include <stdio.h>

int GCD(int, int);

int main(void)
{
    int x, y;
    printf("Please enter two integers:");
    scanf("%i%i", &x, &y);
    int gcd = GCD(x,y);
    printf("GCD of %i and %i is : %i", x, y, gcd);
    return 0;
}

int GCD(int x, int y)
{
    int gcd;
    for(int i=1; i<=x && i<=y; i++)
    {
        if(x%i==0 && y%i==0)
            gcd = i;
    }
    return gcd;

}
```

Q59: Write down a function that will print all prime numbers between 2 to n. n will be input to your program

```c
#include <stdio.h>

int isPrime(int);

int main(void)
{
    int n;
    printf("Please enter an integer:");
    scanf("%i", &n);
    for(int i=2; i<=n; i++)
    {
        if(isPrime(i))
            printf("%i\n", i);
    }
    return 0;
}

int isPrime(int num)
{
    int check = 1;
    for(int i=2; i<=num/2; i++)
    {
        if(num%i ==0)
        {
            check = 0;
            break;
        }
    }
    if(check==1)
        return 1;
    else
        return 0;
}
```

Q60: Write down a program to swap the value of two variables using pointer

```c
#include <stdio.h>

void swap(int*, int*);

int main(void)
{
    int a, b;
    printf("Please enter two integers:");
    scanf("%i%i", &a, &b);
    swap(&a, &b);
    printf("A: %i, B: %i", a, b);
    return 0;
}

void swap(int *p1, int *p2)
{
    int temp = *p1;
    *p1 = *p2;
    *p2 = temp;
}
```

Q61: Suppose you have 8 rooms:

1	0	1	0	0	1	0	1

Write down a program that will print which rooms are lighted(or digit is 1)

```c
#include <stdio.h>

int main(void)
{
    unsigned char ch; // unsigned no negative number we can store in
 ch
    printf("Please enter a character:");
    scanf("%c", &ch);
    unsigned char mask; // unsigned no negative number we can store
in mask
    for(int i=0, mask=1; i<8; i++, mask<<=1) // mask = mask << 1
    {
        if((ch & mask) == 1)
            printf("Light is on of room number #%i\n", i+1);
        else
           printf("Light is off of room number #%i\n", i+1);
    }
    return 0;
}
```

Q62: Implement your own strlen() function.

```c
#include <stdio.h>

int my_strlen(char str[]);

int main()
{
    printf("Length: %i", my_strlen("Hello"));
    return 0;
}

int my_strlen(char str[])
{
    int count = 0, i = 0;
    while(str[i])
    {
        count++;
        i++;
    }
    return count;
}
```

Q63: Implement your own strcat() function.

```c
#include <stdio.h>

char* my_strcat(char str1[], const char str2[]);

int main()
{
    char s1[] = "Hello ";
    char s2[] = "World!";
    printf("%s", my_strcat(s1, s2));
    return 0;
}

char* my_strcat(char str1[], const char str2[])
{
    int i, j;
    for(i=0; str1[i]!='\0'; i++);
    for(j=0; str2[j]!='\0'; j++)
        str1[i+j] = str2[j];
    str1[i+j] = '\0';
    return str1;
}
```

Q64: Implement your own strcpy() function.

```c
#include <stdio.h>

char* my_strcpy(char dest[], const char src[]);

int main()
{
    char str1[] = "st";
    char str2[] = "str1";
    printf("%s", my_strcpy(str1, str2));
    return 0;
}

char *my_strcpy(char *dest, const char *src)
{
  int i;
  for (i=0; src[i] != '\0'; i++)
    dest[i] = src[i];
  dest[i]= '\0';
  return dest;
}
```

Q65: Implement your own strcmp() function.

```c
#include <stdio.h>

int my_strcmp(char str1[], char str2[]);

int main()
{
    printf("%i", my_strcmp("Hello", "Hello"));
}

int my_strcmp(char str1[], char str2[])
{
    for(int i=0;;i++)
    {
        if(str1[i]=='\0' && str2[i]=='\0')
        {
            return 0;
            break;
        }

        int a1 = (int) str1[i];
        int a2 = (int) str2[i];
        if(a1 > a2)
        {
            return 1;
            break;
        }
        else if(a1 < a2)
        {
            return -1;
            break;
        }

    }
}
```

Q66: Implement your own strncmp() function.

```c
#include <stdio.h>

int my_strncmp(char s1[], char s2[], int n);

int main(void)
{
    printf("%i", my_strncmp("Hello", "Hello", 3));
    return 0;
}

int my_strncmp(char s1[], char s2[], int n)
{
    for(int i=0; i<n; i++)
    {
        if(s1[i] == s2[i])
        {
            if(i==(n-1))
                return 0;
        }
        int a1 = (int) s1[i];
        int a2 = (int) s2[i];
        if(a1>a2)
            return 1;
        if(a2>a1)
            return -1;
    }
}
```

Q67: Write down a program using bitwise operator that will check a given number is even or odd

```c
#include <stdio.h>

int main(void)
{
    int num;
    printf("Please enter an integer:");
    scanf("%i", &num);
    int mask = 1;
    if(num & mask)
    {
        printf("Odd");
    }
    else
    {
        printf("Even");
    }
    return 0;
}
```

Q68: Write down a function that will take parameter that will check a given number is a palindrome or not.

```c
#include <stdio.h>

int isPalindrome(int);

int main(void)
{
    int num;
    printf("Please enter an integer:");
    scanf("%i", &num);
    if(isPalindrome(num))
    {
        printf("The number is a palindrome");
    }
    else
    {
        printf("The number is not a palindrome");
    }
    return 0;
}

int isPalindrome(int n)
{
    int remainder, reversed = 0, num = n;
    while(n != 0)
    {
        remainder = n % 10;
        reversed = reversed * 10 + remainder;
        n = n / 10;
    }
    if(reversed == num)
        return 1;
    else
        return 0;
}
```

Q69: Write a struct of 20 students and store their name, id and blood group

```c
#include <stdio.h>

typedef struct
{
    char studentName[15];
    char studentId[9];
    char bloodGroup[4];
} Student;

int main(void)
{
    Student students[20] = {
        {"Mr. A", "17STA000", "A+"},
        {"Mr. B", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
        {"Mr. C", "17STA000", "A+"},
    };
    for(int i=0; i<20; i++)
    {
        printf("Name: %s\n", students[i].studentName);
        printf("Student ID: %s\n", students[i].studentId);
        printf("Blood Group: %s\n", students[i].bloodGroup);
    }
    return 0;
}
```