Programming with C, Problems and Solutions

Problem 1.1: Write the skeleton of a C program.
Solution:

```
#include <stdio.h>
int main(void)
{
   // your code goes here

   return 0;
}
```

Problem 1.2: Write a program to print the following output:
Hello world!!!

Solution:

```
#include <stdio.h>

int main(void)
{
   printf("Hello, world!\n");
   return 0;
}
```

Problem 1.3: Write a code to print the following output:
Name: Mr. Y
Univ: Comilla University
Solution:

```
#include <stdio.h>

int main(void)
{
   printf("Name: Mr. Y\nUniv: Comilla University\n");
   return 0;
}
```

Problem 1.4: Write a program to print the following output:

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

Solution:

```
#include <stdio.h>

int main(void)
{
   printf("    *       \n");
   printf("   ***      \n");
   printf("  *****     \n");
   printf(" *******   \n");
   printf("*********\n");
   printf(" *******   \n");
   printf("  *****     \n");
   printf("   ***      \n");
   printf("    *       \n");
   return 0;
}
```

Problem 1.5: Write a program to print the following output: [There are two blank lines in the middle]
Name: Your name
Country: Bangladesh

Contact: your email address

Solution:

```
#include <stdio.h>

int main(void)
{
   printf("Name: Saleh\n");
   printf("Country: Bangladesh\n\n");
   printf("Contact: muhammad.saleh.personal@gmail.com\n");
   return 0;
}
```

Problem 2.1: Take three integer variables a, b and c. Assign values to the variables- a = 10, b = 20 and c = 30; Now print the sum of these three variables.

Solution:

```
#include <stdio.h>

int main(void)
{
   int a = 10;
   int b = 20;
   int c = 30;

   int sum = a + b + c;

   printf("The sum of a, b, and c is %d\n", sum);

   return 0;
}
```

Problem 2.2: ASCII Values
Write a program to print the following output:
Ascii value of ‘A’ is: __
Ascii value of ‘@’ is: __

In the blank space you should show the ascii code of the given characters.

Solution:

```
#include <stdio.h>

int main(void)
{
   int ascii_A = 'A';
   int ascii_at = '@';

   printf("Ascii value of 'A' is: %d\n", ascii_A);
   printf("Ascii value of '@' is: %d\n", ascii_at);

   return 0;
}
```

Problem 2.3: Average

Take four double variables x, y, z and avg. Assign values to x, y and z as you want. Now calculate the average of x, y and z and assign it to avg. Finally print the average value like

Average of x, y and z is: —— .

Solution:

```
#include <stdio.h>

int main(void)
{
   double x = 1.5;
   double y = 2.5;
   double z = 3.5;
   double avg = (x + y + z) / 3;

   printf("Average of x, y, and z is: %.2f\n", avg);

   return 0;
}
```

Problem 2.4: Print “Bangladesh” without quotation sign by using ascii values.

[Use the given ascii values- B=66, a=97, n=110, g=103, l=108, a=97, d=100, e=101, s=115, h=104.]

Solution:

```
#include <stdio.h>

int main(void)
{
printf("%c%c%c%c%c%c%c%c%c%c\n", 66, 97, 110, 103, 108, 97, 100, 101, 115, 104);

return 0;
}
```

Problem 2.5: Rahul got 65.00 on physics, 83.50 on mathematics, 85.75 on C programming and 67.50 on English. Now write a program to calculate the average of his marks on 4 subjects and print it up to 2 digit after the decimal point. [The result should look like: XX.XX]

Solution:

```
#include <stdio.h>
int main()
{
   double physics = 65.00;
   double math = 83.50;
   double programming = 85.75;
   double english = 67.50;
   double avg = (physics + math + programming + english) / 4;

   printf("Average: %.2f\n", avg);

   return 0;
}
```

Problem 2.6: Area Of Circle

You are given the radius of a circle, r = 5.5. We know that, pi=3.1416. Now write a program to calculate the area of the given circle and print it up to 2 digit after the decimal point. [The result should look like: XX.XX]

Solution:

```
#include <stdio.h>

int main(void)
{
   double radius = 5.5;
   double pi = 3.1416;
   double area = pi * radius * radius;

   printf("Area: %.2f\n", area);

   return 0;
}
```

Problem 2.7:

Take two integer variables i = 0 and j = 0. Now write the output of the following program without running the code.

```
int main()
int i = 0;
int j = 0;
j = i++ + ++i;
printf("%d %d",i,j);
}
```

Solution:

Ami pore likhbo bhebe blank rekhe disi :")

Problem 3.1: Equation

Take four integer variables a, b, x and y. Scan the values of the variables from user using scanf() function. Now print the output of the following equation:

(a*b) + (x*y)

Solution:

```
#include <stdio.h>
int main(void)
{
   int a, b, x, y;
   printf("Enter values for a, b, x, and y: ");
   scanf("%d%d%d%d", &a, &b, &x, &y);

   int result = (a * b) + (x * y);
   printf("Result: %d\n", result);
   return 0;
}
```

Problem 3.2: Fahrenheit

Take temperature of Dhaka city as input in Celsius scale from the user using scanf() function and convert it to Fahrenheit and print it.

[Formula: F = C(9/5) +32]

Solution:

```
#include <stdio.h>
int main(void)
{
   double celsius;
   printf("Enter temperature in Celsius: ");
   scanf("%lf", &celsius);

   double fahrenheit = celsius * (9.0/5.0) + 32;
   printf("%.2f degrees Celsius is equivalent to %.2f degrees Fahrenheit.\n", celsius,
fahrenheit);

   return 0;
}
```

Problem 3.2: Take a small letter alphabet as input from the user and print the capital version of that letter. [If user gives input ‘a’ you should print ‘A’]

Solution:

```
#include <stdio.h>
#include <ctype.h>

int main(void) {

  char letter;
  printf("Enter a small letter alphabet: ");
  scanf("%c", &letter);

  printf("%c\n", toupper(letter));
  return 0;
}
```

Problem 4.1: Suppose you are going to apply for admission in a college. If you got GPA 5 in SSC exam then you can apply for that college. Now give your GPA as input from the keyboard and print “YES” if you can apply otherwise print “NO”.

Solution:

```
#include <stdio.h>

int main(void) {

  float gpa;
  printf("Enter your GPA: ");
  scanf("%f", &gpa);

  if (gpa >= 5.0) {
    printf("YES\n");
  } else {
    printf("NO\n");
  }
  return 0;
}
```

Problem 4.2: Take a value from user and assume that- it is the number of his math exam.

Now you have to write a program which shows the grade depending on the given scale.

(A+: 80-100, A: 70-79, A-: 60-69, B: 50-59, C: 40-49, D :33-39 ,F :0-32)

Solution:

```
#include <stdio.h>

int main(void) {
  // Get the exam score from the user
  int score;
  printf("Enter your exam score: ");
  scanf("%d", &score);

  // Determine the grade based on the score
  if (score >= 80 && score <= 100) {
    printf("A+\n");
  } else if (score >= 70 && score <= 79) {
    printf("A\n");
  } else if (score >= 60 && score <= 69) {
    printf("A-\n");
  } else if (score >= 50 && score <= 59) {
    printf("B\n");
  } else if (score >= 40 && score <= 49) {
    printf("C\n");
  } else if (score >= 33 && score <= 39) {
    printf("D\n");
  } else if (score >= 0 && score <= 32) {
    printf("F\n");
  } else {
    printf("Invalid score\n");
  }
  return 0;
}
```

Problem 4.3: You are going to open a bank account. If your age is greater than 18 then you can open an account. Get your age by input and print “Yes” if you can open an account otherwise print “No”.

Solution:

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


  // Get the age from the user
  int age;
  printf("Enter your age: ");
  scanf("%d", &age);


  // Check if the age is greater than 18
  if (age > 18) {
    printf("Yes\n");
  } else {
    printf("No\n");
  }
  return 0;
}
```

Problem 4.4: Write a program which determines whether a number is ODD or EVEN.

Solution:

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


 // Get the number from the user
 int num;
 printf("Enter a number: ");
 scanf("%d", &num);


// Check if the number is odd or even
 if (num % 2 == 0) {
  printf("Even\n");
 } else {
  printf("Odd\n");
 }
 return 0;
}
```

Problem 4.5: Take an integer number as input from user and print “Yes” if the number is divisible by 3 and 5. And print “No” if the number is not.
Solution:

```
#include <stdio.h>
int main(void) {
  // Get the number from the user
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);

  // Check if the number is divisible by 3 and 5
  if (num % 3 == 0 && num % 5 == 0) {
    printf("Yes\n");
  } else {
    printf("No\n");
  }
  return 0;
}
```

Problem 4.6: Take 3 integers from user using scanf() function and write a program to find the maximum one.
Solution:

```
#include <stdio.h>

int main(void) {
  // Get the three numbers from the user
  int num1, num2, num3;
  printf("Enter three numbers: ");
  scanf("%d %d %d", &num1, &num2, &num3);

  // Find the maximum of the three numbers
```

```
 int max;
 if (num1 > num2) {
  max = num1;
 } else {
  max = num2;
 }
 if (num3 > max) {
  max = num3;
 }

 // Print the maximum number
 printf("Maximum: %d\n", max);
 return 0;
}
```

Problem 4.7: Take a small letter alphabet as input and print whether it is VOWEL or CONSONANT.

Solution:

```
#include <stdio.h>
#include <ctype.h>

int main(void) {
 // Get the letter from the user
 char letter;
 printf("Enter a small letter alphabet: ");
 scanf("%c", &letter);

 // Check if the letter is a vowel or consonant
 if (tolower(letter) == 'a' || tolower(letter) == 'e' || tolower(letter) == 'i' ||
tolower(letter) == 'o' || tolower(letter) == 'u') {
 printf("Vowel\n");
```

```
  } else {
    printf("Consonant\n");
  }
  return 0;
}
```

Problem 4.8: Write a program that takes an integer as input [1 – 12] and print the corresponding month name. [If user gives input '1' you should print 'January']

Solution:

```
#include <stdio.h>


int main(void) {
  // Get the month number from the user
  int month;
  printf("Enter a month number (1-12): ");
  scanf("%d", &month);

  // Print the corresponding month name
  switch (month) {
    case 1:
      printf("January\n");
      break;
    case 2:
      printf("February\n");
      break;
    case 3:
      printf("March\n");
```

```
  break;
case 4:
  printf("April\n");
  break;
case 5:
  printf("May\n");
  break;
case 6:
  printf("June\n");
  break;
case 7:
  printf("July\n");
  break;
case 8:
  printf("August\n");
  break;
case 9:
  printf("September\n");
  break;
case 10:
  printf("October\n");
  break;
case 11:
  printf("November\n");
  break;
case 12:
  printf("December\n");
  break;
```

```
    default:
      printf("Invalid month number\n");
      break;
  }
  return 0;
}
```

Problem 4.9: You are given the rank and salary scale of a company.

Rank – salary
1 – 2,50,000 BDT
2 – 2,10,000 BDT
3 – 1,50,000 BDT
4 – 80,000 BDT
>=5 – 50,000 BDT

Now, take the rank as input from the user and print the salary of the given rank. [If user gives input '3' you should print 'Your Salary: 1,50,000 BDT']

Solution:

```
#include <stdio.h>

int main(void) {
  // Get the rank from the user
  int rank;
  printf("Enter your rank: ");
  scanf("%d", &rank);

  // Determine the salary based on the rank
  int salary;
  if (rank == 1) {
    salary = 250000;
  } else if (rank == 2) {
    salary = 210000;
  } else if (rank == 3) {
    salary = 150000;
```

```
  } else if (rank == 4) {
    salary = 80000;
  } else if (rank >= 5) {
    salary = 50000;
  } else {
    salary = 0;
  }

  // Print the salary
  printf("Your salary: %d BDT\n", salary);
  return 0;
}
```

Problem 4.10:

Take two integers indicating the x and y coordinate of a two-dimensional graph paper where the center point is x = 0 and y = 0. Now print the quadrant of the given point. [If user gives input (4,5) you should print ‘First quadrant’; If user gives input (-4,-5) you should print ‘Third quadrant’]

Solution:

```
#include <stdio.h>

int main(void) {
  // Get the x and y coordinates from the user
  int x, y;
  printf("Enter the x and y coordinates: ");
  scanf("%d %d", &x, &y);

  // Determine the quadrant based on the coordinates
  if (x > 0 && y > 0) {
    printf("First quadrant\n");
  } else if (x < 0 && y > 0) {
    printf("Second quadrant\n");
  } else if (x < 0 && y < 0) {
    printf("Third quadrant\n");
```

```
  } else if (x > 0 && y < 0) {
    printf("Fourth quadrant\n");
  } else {
    printf("Origin\n");
  }
  return 0;
}
```

Problem 5.1: Print the EVEN numbers between 1 to 100 using loop.

Solution:

```
#include <stdio.h>

int main(void) {
  // Print the even numbers between 1 and 100
  for (int i = 2; i <= 100; i += 2) {
    printf("%d\n", i);
  }
  return 0;
}
```

Problem 5.2: Print the numbers between 100 to 200 which are completely divisible by 3 and 5.

Solution:

```
#include <stdio.h>

int main(void) {
  // Print the numbers between 100 and 200 that are divisible by 3 and 5
  for (int i = 100; i <= 200; i++) {
    if (i % 3 == 0 && i % 5 == 0) {
      printf("%d\n", i);
    }
  }
  return 0;
}
```

Problem 5.3: Star Triangle

Write a program to print the following output using loop.

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

Solution:

```
#include <stdio.h>

int main(void) {
  // Print the pattern
  for (int i = 1; i <= 4; i++) {
    for (int j = 1; j <= i; j++) {
      printf("*");
    }
    printf("\n");
  }
  return 0;
}
```

Problem 5.4: Multiplication

Take an integer as input and print it's multiplication table up to 10. If user gives 5, your output should look like the following example

```
5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
 .
 .
 .
5 * 10 = 50
```

Solution:

```
#include <stdio.h>

int main(void) {
  // Get the number from the user
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);

  // Print the multiplication table
  for (int i = 1; i <= 10; i++) {
    printf("%d * %d = %d\n", num, i, num * i);
  }
  return 0;
}
```

Problem 5.5: Series sum

Write a program which will print the summation of the given series- 101 + 99 + 97 + …….. + 3 + 1 = ?

Solution:

```
#include <stdio.h>

int main(void) {
  // Initialize the sum to 0
  int sum = 0;

  // Add the numbers from 101 to 1 to the sum
  for (int i = 101; i >= 1; i -= 2) {
    sum += i;
  }

  // Print the sum
  printf("Sum: %d\n", sum);
  return 0;
}
```

Problem 5.6: Pattern

Write a program to program to print the following output using loop-

```
*
```

Blank Line

```
* * *
```

Blank Line

```
* * * * *
```

Blank Line

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

Solution:

```
#include <stdio.h>


int main(void) {
  // Print the pattern
  for (int i = 1; i <= 3; i++) {
    for (int j = 1; j <= i * 2 - 1; j++) {
      printf("* ");
    }
    printf("\n\n");
  }
  return 0;
}
```

Problem 5.7: Pattern II

Write a program to print the following output using loop.

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

Solution:

```
#include <stdio.h>

int main(void) {
  // Print the pattern
  for (int i = 4; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
      printf("* ");
    }
    printf("\n");
  }
  return 0;
}
```

Problem 5.8: Number Art

Write a program to print the following output using loop

```
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

Solution:

```
#include <stdio.h>

int main(void) {
  // Print the pattern
  for (int i = 5; i >= 1; i--) {
    for (int j = 1; j <= i; j++) {
      printf("%d ", j);
    }
    printf("\n");
  }
  return 0;
}
```

Problem 5.9: Write a program to display “A” to “Z” using loop.

Solution:

```
#include <stdio.h>

int main()
{
char ch; // variable to store character

// loop from 'A' to 'Z'
for (ch = 'A'; ch <= 'Z'; ch++)
{
printf("%c ", ch); // print character
}
return 0;
}
```