1. main.c

```
#include "header.h"
#include <stdio.h>
#include <ctype.h>
int main(){
   int questionNumber;
   printf("Enter Question Number ( 1 - 15 ):");
   scanf("%d",&questionNumber);
   getchar();
   switch (questionNumber){
      case 1: {
         ThreeNumbersInLine(10);
         break;
      }
      case 2: {
         EvenNumbersCount(1 , 200);
         break;
      }
      case 3: {
         char str[1000];
         printf("Enter text: ");
         scanf("%[^\n]s",str);
         NumberOfVowels(str , 1000);
         break;
      }
      case 4:{
         float a , b;
         printf("Enter two floating point numbers: ");
         scanf("%f%f", &a, &b);
         int sum = AddTwoFloat(a, b);
         printf("Sum of %f and %f converted to int is %d", a, b, sum);
```

```
    break;
}
case 5:{
    float a;
    printf("Enter floating point number: ");
    scanf("%f", &a);
    printf("Rightmost digit of integral part: %d", RightMost(a));
    break;
}
case 6:{
    float principal, rate, time;
    printf("Enter the principal amount: ");
    scanf("%f", &principal);
    printf("Enter the rate of interest (in percentage): ");
    scanf("%f", &rate);
    printf("Enter the time period (in years): ");
    scanf("%f", &time);
    printf("Simple Interest = %.2f\n", SimpleInterest(principal , rate , time));
    printf("Compound Interest = %.2f\n", CompoundInterest(principal , rate , time));
    break;
}
case 7:{
    const float HRA = 10.0 / 100;
    const float TA = 5.0 / 100;
    float base, salary;
    printf("Enter the basic salary : ");
    scanf("%f",&base);
    salary = base + (base * HRA) + (base * TA);
    printf("The salary of the employee is : %f",salary);
    break;
}
```

```
case 8:{
   bill();
   break;
}
case 9:{
   int number;
   printf("Enter an integer: ");
   scanf("%d", &number);
   printf("Decimal: %d\n", number);
   printf("Octal: %o\n", number);
   printf("Hexadecimal: %x\n", number);
   break;
}
case 10:{
   float value;
   printf("Enter a floating point value: ");
   scanf("%f", &value);
   printf("Value in exponent form (correct to two decimal places): %.2e\n", value);
   printf("Value in exponent form (correct to four decimal places): %.4e\n", value);
   printf("Value in exponent form (correct to eight decimal places): %.8e\n", value);
   break;
}
case 11:{
   char ch;
   printf("Enter character : ");
   scanf("%c", &ch);
   if(ch >= 'a' && ch <= 'z'){
      printf("Captial letter is: %c", ch - 32);
   }
   else if(ch >= 'A' && ch <= 'Z'){
      printf("Small letter is: %c", ch + 32);
```

```
    }
    break;
}
case 12:{
    float a,b,c;
    float result;
    printf("Enter three floating point numbers: ");
    scanf("%f%f%f", &a, &b, &c);
    result = a + b + c;
    printf("Their sum is %.2f",result);
    break;
}
case 13:{
    char s;
    printf("Enter a character: ");
    scanf("%c",&s);
    if(s>='a' && s <='z'){
        printf("It is lower-case alphabet");
    }
    else if(s>='A' && s <='Z'){
        printf("It is upper-case alphabet");
    }
    else if(s>='0' && s<='9'){
        printf("It is Number");
    }
    else{
        printf("It is Special Character");
    }
    break;
}
case 14:{
```

```
    int n;
    printf("Enter the value of n: ");
    scanf("%d", &n);
    int sum = 0;
    float avg;
    for(int i = 1; i <= n; i++){
        sum += i;
    }
    avg = sum / n;
    printf("The sum is: %d\n", sum);
    printf("The average is: %f\n", avg);
    break;
}
case 15:{
    int m, n, i;
    printf("Enter the values of m and n: ");
    scanf("%d%d", &m, &n);
    printf("Odd Numbers are: ");
    for (i = m; i < n; i++){
    if (i % 2 == 1)
        printf("%d ", i);
    }
    break;
}
case 16:{
    int m, n, i, j;
    printf("Enter the range m and n : ");
    scanf("%d %d", &m, &n);
    printf("Prime Numbers are: ");
    for(i = m; i <= n; i++){
        int flag = 0;
```

```
        for(j = 2; j <= i - 1; j++){
            if(i % j == 0){
                flag = 1;
                break;
            }
        }
        if(i == 1){
            continue;
        }
        else if(flag == 0){
            printf("%d ", i);
        }
        else{
            continue;
        }
    }
    break;
}
case 17:{
    int a;
    printf("Enter Numbers (enter -1 to stop):\n");
    while(1){
        scanf("%d", &a);
        if(a == -1){
            break;
        }
        Armstrong(a);
    }
    break;
}
case 18:{
```

```
    int wind;
    float temp;
    float WCI;
    printf("Enter the wind speed:");
    scanf("%d",&wind);
    getchar();
    printf("Enter the temperature:");
    scanf("%f", &temp);
    if(wind >= 0 && wind <= 4){
        WCI = temp;
        printf("The value of WCI is: %f.\n", WCI);
    }
    else if(wind >= 45){
        WCI = 1.6 * temp - 55;
        printf("The value of WCI is: %f.\n",WCI);
    }
    else{
        WCI=91.4+(91.4-temp)*(0.0203*wind-0.304*wind*1/2-0.474);
        printf("The value of WCI is: %f.\n",WCI);
    }
    break;
}
case 19:{
    int n;
    printf("Enter an integer: ");
    scanf("%d", &n);
    printf("Is %d divisible by 5 and 6? ", n);
    if ((n % 5 == 0) && (n % 6 == 0)){
        printf("true\n");
    } else {
        printf("false\n");
```

```
            }
            printf("Is %d divisible by 5 or 6? ", n);
            if ((n % 5 == 0) || (n % 6 == 0)){
                printf("true\n");
            } else {
                printf("false\n");
            }
            printf("Is %d divisible by 5 or 6, but not both? ", n);
            if (((n % 5 == 0) || (n % 6 == 0)) && ((n % 5 != 0) && (n % 6 != 0))){
                printf("true\n");
            } else {
                printf("false\n");
            }
            break;
        }
        case 20:{
            bill2();
            break;
        }
        default:
            break;
    }
    return 0;
}
```

2. header.h

```
#define MAX_ITEMS 100

typedef struct {
   char name[50];
   int quantity;
   float pricePerUnit;
} Item;

typedef struct{
   char name[50];
   float price;
}Item1;

void ThreeNumbersInLine(int n);
void EvenNumbersCount(int min , int max);
void NumberOfVowels(char str[] , int size);
int AddTwoFloat(float a , float b);
int RightMost(float a);
float SimpleInterest(float p , float r , float t);
float CompoundInterest(float p , float r , float t);
void bill();
void Armstrong(int n);
void bill2();
```

3. logic.c

```
#include "header.h"
#include <stdio.h>
#include <limits.h>
#include <stdlib.h>
#include <math.h>

void ThreeNumbersInLine(int n){
   int numbers[n];
   printf("Enter %d Numbers : \n", n);
   for(int i = 0 ; i < n ; i++){
      scanf("%d",&numbers[i]);
   }
   for(int i = 0 ; i < n ; i++){
      if(i % 3 == 2){
         printf("%d", numbers[i]);
         printf("\n");
      }
      else{
         printf("%d, ", numbers[i]);
      }
   }
}

void EvenNumbersCount(int min , int max){
   int count = 0;
   int sum = 0;
   for(int i = min ; i <= max ; i++){
      if(i % 2 == 0){
         count++;
         sum += i;
```

```
        }
    }
    printf("Even Numbers between %d to %d are %d and their sum is : %d", min, max, count, sum);
}

void NumberOfVowels(char str[] , int size){
    int count = 0;
    for(int i = 0 ;  str[i] != '\0' ; i++){
        if((str[i] == 'a') || (str[i] == 'e') || (str[i] == 'i') || (str[i] == 'o') || (str[i] == 'u') || (str[i] == 'A') ||
(str[i] == 'E') || (str[i] == 'I') || (str[i] == 'O') || (str[i] == 'U')){
            count++;
        }
    }
    printf("Number of Vowels are %d", count);
}

int AddTwoFloat(float a , float b){
    float sum = a + b;
    int s = (int)sum;
    return s;
}

int RightMost(float a){
    int s = (int)a;
    int r = s % 10;
    return r;
}

float SimpleInterest(float p , float r , float t){
    float si = (p * r * t)/100;
    return si;
```

```
}

float CompoundInterest(float p , float r , float t){
   float ci = p * pow((1 + r / 100) , t) - p;
   return ci;
}
void bill(){
   Item items[MAX_ITEMS];
   int n;
   float totalAmount = 0.0;

   printf("Enter the number of items: ");
   scanf("%d", &n);

   if (n <= 0 || n > MAX_ITEMS) {
      printf("Invalid number of items.\n");
      return;
   }

   for (int i = 0; i < n; i++) {
      printf("\nEnter details for item %d:\n", i + 1);
      printf("Item name: ");
      scanf(" %[^\n]", items[i].name);
      printf("Quantity: ");
      scanf("%d", &items[i].quantity);
      printf("Price per unit: ");
      scanf("%f", &items[i].pricePerUnit);
   }

   printf("\n************************ B I L L ************************\n");
   printf("ITEM\t\tQUANTITY\tPRICE\t\tAMOUNT\n");
```

```
    printf("_____\n");

    for (int i = 0; i < n; i++) {
        float amount = items[i].quantity * items[i].pricePerUnit;
        printf("%-15s\t%d\t\t%.2f\t\t%.2f\n", items[i].name, items[i].quantity, items[i].pricePerUnit,
amount);
        totalAmount += amount;
    }

    printf("-----------------------------------------------------------\n");
    printf("Total Amount: %.2f\n", totalAmount);
    printf("-----------------------------------------------------------\n");
}

void Armstrong(int n){
    int original, power, lastdigit, sum = 0, count = 0;
    original = n;
    while(n != 0){
        n = n / 10;
        count++;
    }
    n = original;

    while(n != 0){
        lastdigit = n % 10;
        power = 1;
        for(int i = 0 ; i < count ; i++){
            power *= lastdigit;
        }
        sum = sum + power;
        n = n / 10;
```

```
    }
    if(sum == original){
        printf("The Number %d is an Armstrong Number\n", original);
    }
    else{
        printf("The Number %d is not an Armstrong Number\n", original);
    }
}

void bill2(){
    Item1 item[MAX_ITEMS];
    int n , shipping;
    float Amount , totalAmount , ShippingAmount;
    printf("Enter the number of items : ");
    scanf("%d",&n);
    for(int i=0;i<n;i++){
        printf("Enter the item : ");
        scanf("%s", item[i].name);
        printf("Enter the price : ");
        scanf("%f",&item[i].price);
        Amount += item[i].price;
    }
    printf("Overnight delivery (Enter 0 for no and 1 for yes): ");
    scanf("%d",&shipping);

    if(Amount > 100 && shipping == 1){
        ShippingAmount = 80;
        totalAmount = Amount + 80;
    }
    else if(Amount > 100 && shipping == 0){
        ShippingAmount = 30;
```

```
        totalAmount = Amount + 30;
    }
    else if(Amount < 100 && shipping == 1){
        ShippingAmount = 70;
        totalAmount = Amount + 70;
    }
    else{
        ShippingAmount = 20;
        totalAmount = Amount + 20;
    }
    printf(":Invoice\n");
    for(int i = 0 ; i < n ; i++){
        printf("%-15s ",item[i].name);
        printf("Rs. %f \n",item[i].price);
    }
    printf("Shipping Rs. %.2f\n",ShippingAmount);
    printf("Total Amount Rs. %f", totalAmount);
}
```

Output of Control Statements Assignment:

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>gcc -Wall main.c logic.c -o a

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):1
Enter 10 Numbers :
1 2 3 4 5 6 7 8 9 10
1, 2, 3
4, 5, 6
7, 8, 9
10,
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):2
Even Numbers between 1 to 200 are 100 and their sum is : 10100
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):3
Enter text: Tanishq Ganesh Tote
Number of Vowels are 6
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>
```

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):4
Enter two floating point numbers: 5.68 3.22
Sum of 5.680000 and 3.220000 converted to int is 8
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):5
Enter floating point number: 9.336
Rightmost digit of integral part: 9
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):6
Enter the principal amount: 5000
Enter the rate of interest (in percentage): 7.5
Enter the time period (in years): 2
Simple Interest = 750.00
Compound Interest = 778.13

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):7
Enter the basic salary : 20000
The salary of the employee is : 23000.000000
```

```
Enter Question Number ( 1 - 15 ):8
Enter the number of items: 5

Enter details for item 1:
Item name: Notebook
Quantity: 5
Price per unit: 100

Enter details for item 2:
Item name: Pen
Quantity: 10
Price per unit: 10

Enter details for item 3:
Item name: Pencil
Quantity: 4
Price per unit: 5

Enter details for item 4:
Item name: Soap
Quantity: 2
Price per unit: 25

Enter details for item 5:
Item name: earphones
Quantity: 1
Price per unit: 1500
```

```
************************ B I L L ************************
ITEM            QUANTITY        PRICE           AMOUNT
------------------------------------------------------------
Notebook        5               100.00          500.00
Pen             10              10.00           100.00
Pencil          4               5.00            20.00
Soap            2               25.00           50.00
earphones       1               1500.00         1500.00
------------------------------------------------------------
Total Amount: 2170.00
------------------------------------------------------------
```

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):9
Enter an integer: 10
Decimal: 10
Octal: 12
Hexadecimal: a

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):10
Enter a floating point value: 5.63
Value in exponent form (correct to two decimal places): 5.63e+000
Value in exponent form (correct to four decimal places): 5.6300e+000
Value in exponent form (correct to eight decimal places): 5.63000011e+000

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):11
Enter character : T
Small letter is: t
```

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):12
Enter three floating point numbers: 5.63 8.24 9.12
Their sum is 22.99
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):13
Enter a character: T
It is upper-case alphabet
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):14
Enter the value of n: 30
The sum is: 465
The average is: 15.000000

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):15
Enter the values of m and n: 2 10
Odd Numbers are: 3 5 7 9
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):16
Enter the range m and n : 2 10
Prime Numbers are: 2 3 5 7
```

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):17
Enter Numbers (enter -1 to stop):
153
The Number 153 is an Armstrong Number
261
The Number 261 is not an Armstrong Number
-1

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):18
Enter the wind speed:2
Enter the temperature:25
The value of WCI is: 25.000000.

E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):19
Enter an integer: 25
Is 25 divisible by 5 and 6? false
Is 25 divisible by 5 or 6? true
Is 25 divisible by 5 or 6, but not both? false
```

```
E:\COEP\DSA\Assignments\ControlStatementsLabAssignment>a
Enter Question Number ( 1 - 15 ):20
Enter the number of items : 2
Enter the item : burger
Enter the price : 150
Enter the item : pizza
Enter the price : 500
Overnight delivery (Enter 0 for no and 1 for yes): 1
:Invoice
burger          Rs. 150.000000
pizza           Rs. 500.000000
Shipping Rs. 80.00
Total Amount Rs. 730.000000
```