

Module -1

Logic Building and Problem Solving

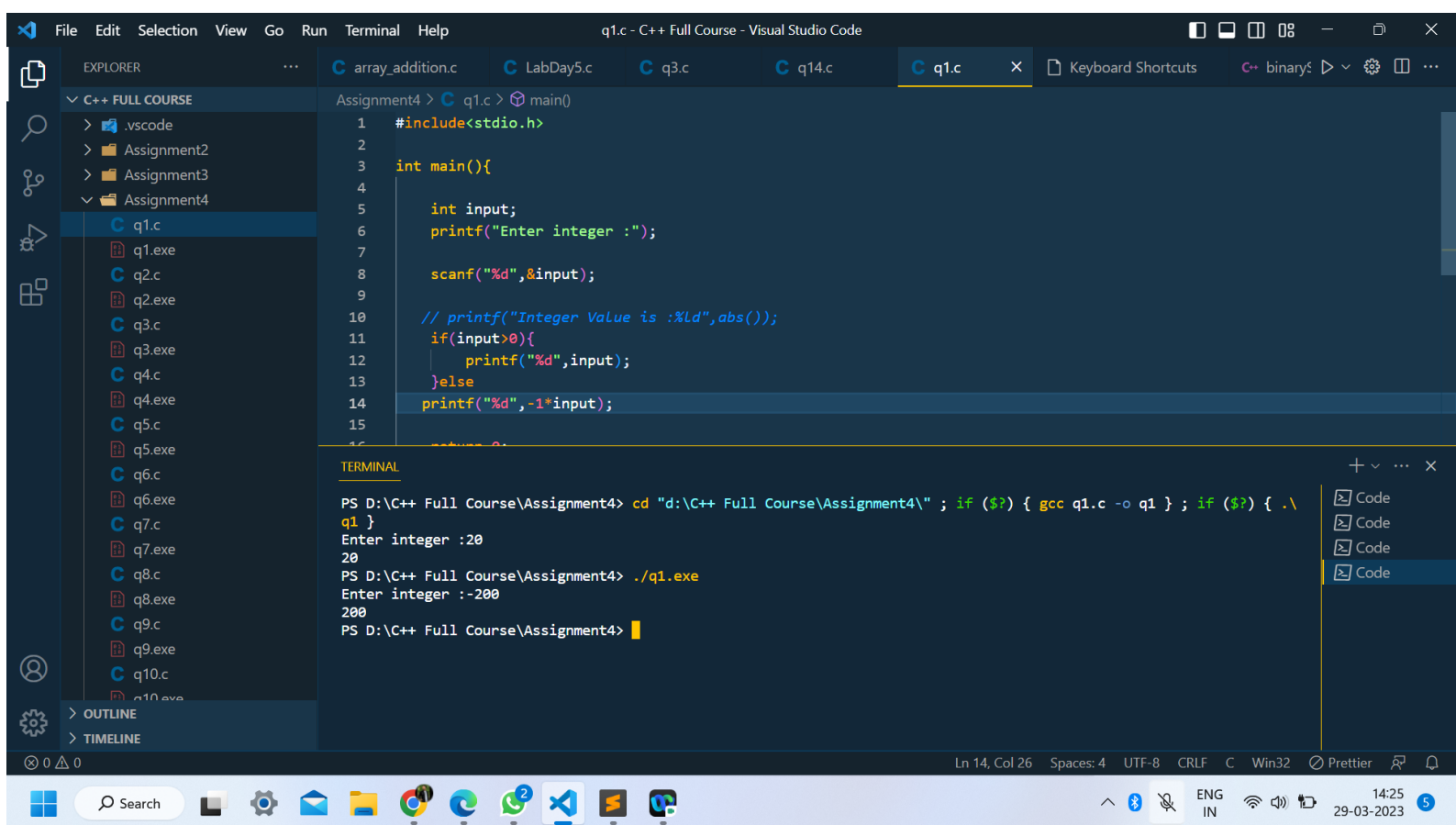
Assignment No. 4

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Q1)



```
File Edit Selection View Go Run Terminal Help
q1.c - C++ Full Course - Visual Studio Code

EXPLORER
C++ FULL COURSE
  .vscode
  Assignment2
  Assignment3
  Assignment4
    q1.c
    q1.exe
    q2.c
    q2.exe
    q3.c
    q3.exe
    q4.c
    q4.exe
    q5.c
    q5.exe
    q6.c
    q6.exe
    q7.c
    q7.exe
    q8.c
    q8.exe
    q9.c
    q9.exe
    q10.c
    q10.exe

OUTLINE
TIMELINE

array_addition.c LabDay5.c q3.c q14.c q1.c x Keyboard Shortcuts binary$

Assignment4 > q1.c > main()
1 #include<stdio.h>
2
3 int main(){
4
5     int input;
6     printf("Enter integer :");
7
8     scanf("%d",&input);
9
10    // printf("Integer Value is :%ld",abs());
11    if(input>0){
12        printf("%d",input);
13    }else
14        printf("%d",-1*input);
15
16    return 0;
17 }

TERMINAL
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q1.c -o q1 } ; if ($?) { .\q1 }
Enter integer :20
20
PS D:\C++ Full Course\Assignment4> ./q1.exe
Enter integer : -200
200
PS D:\C++ Full Course\Assignment4>
```

Q2)

The screenshot displays the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer panel on the left shows the file structure, including folders for assignments and individual question files (q1.c to q10.c and their corresponding .exe files). The file "q2.c" is selected and open in the editor.

The code in "q2.c" is as follows:

```
1 #include<stdio.h>
2 int main(){
3     int input,marks,fails=0,sum =0;
4     printf("Enter Number of grades = ");
5     scanf("%d",&input);
6     for (int i = 1; i<=input; i++)
7     {
8         printf("Enter grade #d : ",i);
9         scanf("%d",&marks);
10        if(marks<65){
11            fails++;
12            sum+=marks;
13        }else{
14            sum += marks;
15        }
16    }
17    printf("\nGrade Average = %.2f", (float)(sum/input));
18    printf("\nNumber of failures = %d",fails);
19    return 0;
```

The TERMINAL panel at the bottom shows the execution of the program. The command prompt is at "PS D:\C++ Full Course\Assignment4>". The user enters "cd \"d:\C++ Full Course\Assignment4\" ; if (\$?) { gcc q2.c -o q2 } ; if (\$?) { .\q2 }". The program prompts for the number of grades (3), then for each grade (92, 60, 89). The output shows "Grade Average = 80.00" and "Number of failures = 1".

The status bar at the bottom indicates the current cursor position is at line 10, column 22, with 4 spaces, UTF-8 encoding, CRLF line endings, and Win32 architecture. The Prettier formatter is active. The system tray shows the date and time as 14:32 on 29-03-2023.

Q3)

```
#include<stdio.h>
#include <stdlib.h>
int main(){
    int input,a,b;

    printf("Enter Integers a and b : ");
        scanf("%d%d",&a,&b);

    printf("Enter 1 for Addition\n");
    printf("Enter 2 for Substration\n");
    printf("Enter 3 for Multiplication\n");
    printf("Enter your choice : ");

    scanf("%d",&input);

    int c = abs(a-b);
    switch(input)
    {
        case 1:
            printf("Addition of a and b : ");

            printf("%d",a+b);
            break;
```

case 2:

```
printf("Substration of a and b : ");
```

```
printf(" %d",c);
```

```
break;
```

case 3:

```
printf("Multiplicaiton of a and b : %d",a*b);
```

```
break;
```

default:

```
printf("Enter 1,2 and 3 choice !!");
```

```
break;
```

```
}
```

```
return 0;
```

```
}
```

q3.c - C++ Full Course - Visual Studio Code

File Edit Selection View Go Run Terminal Help

EXPLORER

- C++ FULL COURSE
 - .vscode
 - Assignment2
 - Assignment3
 - Assignment4
 - q1.c
 - q1.exe
 - q2.c
 - q2.exe
 - q3.c
 - q3.exe
 - q4.c
 - q4.exe
 - q5.c
 - q5.exe
 - q6.c
 - q6.exe
 - q7.c
 - q7.exe
 - q8.c
 - q8.exe
 - q9.c
 - q9.exe
 - q10.c
 - q10.exe

OUTLINE

TIMELINE

array_addition.c LabDay5.c q3.c q14.c q1.c q2.c Keyboard Shortcuts

```
Assignment4 > C q3.c > main()
19 case 1:
20     printf("Addition of a and b : ");
21
22     printf("%d",a+b);
23     break;
24
25 case 2:
26     printf("Substration of a and b : ");
27
28     printf(" %d",c);
29     break;
30
31 case 3:
32
33     printf("Multiplicaiton of a and b : %d",a*b);
34     break;
35
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q3.c -o q3 } ; if ($?) { .\q3 }
Enter Integers a and b : 100 200
Enter 1 for Addition
Enter 2 for Substration
Enter 3 for Multiplication
Enter your choice : 2
Substration of a and b : 100
PS D:\C++ Full Course\Assignment4>
```

Ln 16, Col 15 Spaces: 6 UTF-8 CRLF C Win32 Prettier

14:40 29-03-2023

Q4)

The screenshot displays the Visual Studio Code interface with a C++ project titled "C++ Full Course - Visual Studio Code". The Explorer panel on the left shows the project structure, including folders for assignments and individual question files (q1.c to q10.c). The main editor window shows the code for "q4.c", which implements a program to calculate the sum of the first 'n' natural numbers. The code uses a for loop to iterate from 1 to the input value, accumulating the sum. The output in the terminal shows the program running successfully with an input of 10 and a sum of 55.

```
1 #include <stdio.h>
2 int main()
3 {
4     int input, sum = 0;
5
6     printf("Input an integer to find sum of n natural numbers : ");
7     scanf("%d", &input);
8
9     for (int i = 1; i <= input; i++)
10    {
11        sum += i;
12    }
13    printf("Sum of n natural numbers is = %d", sum);
14
15    return 0;
16 }
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q4.c -o q4 } ; if ($?) { .\q4 }
Input an integer to find sum of n natural numbers : 10
Sum of n natural numbers is = 55
PS D:\C++ Full Course\Assignment4>
```

Q5)

Visual Studio Code interface showing a C++ program for finding the Greatest Common Divisor (GCD) of two numbers.

EXPLORER:

- C++ FULL COURSE
 - .vscode
 - Assignment2
 - Assignment3
 - Assignment4
 - q1.c
 - q1.exe
 - q2.c
 - q2.exe
 - q3.c
 - q3.exe
 - q4.c
 - q4.exe
 - q5.c
 - q5.exe
 - q6.c
 - q6.exe
 - q7.c
 - q7.exe
 - q8.c
 - q8.exe
 - q9.c
 - q9.exe
 - q10.c
 - q10.exe

Code Editor (q5.c):

```
1 #include<stdio.h>
2
3 int main(){
4
5     int a,b,gcd_a,gcd_b,gcd;
6     printf("Enter integer a and b : ");
7
8     scanf("%d%d",&a,&b);
9
10    for (int i = 1; i <=a&& i<=b; i++)
11    {
12        if(a%i==0&&b%i==0){
13
14            gcd =i;
15        }
16    }
17    printf("The Gratest common divisor is %d",gcd);
18    return 0;
19 }
```

TERMINAL:

```
PS D:\C++ Full Course\Assignment4> ./q5.exe
Enter integer a and b : 20 24
The Gratest common divisor is 4
PS D:\C++ Full Course\Assignment4> ./q5.exe
Enter integer a and b : 87 45
The Gratest common divisor is 3
PS D:\C++ Full Course\Assignment4>
```

Ln 2, Col 1 Spaces: 4 UTF-8 CRLF C Win32 Prettier

Q6)

The screenshot displays the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer panel on the left shows the project structure, including folders for assignments and individual C files and executables. The main editor window shows the code for "q6.c", which is a simple program to calculate the absolute value of an integer using the `abs` function from `stdlib.h`. The code is as follows:

```
1 #include<stdio.h>
2 #include<stdlib.h>
3
4 int main(){
5
6     int input;
7     printf("Enter integer :");
8
9     scanf("%d",&input);
10
11     printf("Absolute Value of %d is %d",input,abs(input));
12
13
14
15     return 0;
16 }
```

The TERMINAL panel at the bottom shows the execution of the program. It displays the command to compile and run the program, followed by two test cases: one with a positive integer (10) and one with a negative integer (-145). The output correctly shows the absolute values (10 and 145 respectively).

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q6.c -o q6 } ; if ($?) { .\q6 }
Enter integer :10
Integer Value of 10 is 10
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q6.c -o q6 } ; if ($?) { .\q6 }
Enter integer :-145
Absolute Value of -145 is 145
PS D:\C++ Full Course\Assignment4>
```

The status bar at the bottom indicates the current cursor position (Ln 11, Col 20), encoding (UTF-8), and other settings.

Q7)

The screenshot shows the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer panel on the left shows a folder structure with "Assignment4" containing files q1.c through q10.c and their corresponding .exe files. The main editor displays the code for "q7.c", which is a C++ program to check if a number is perfect. The code includes `<stdio.h>` and defines a `main()` function. It prompts the user to "Input an integer :", reads the input, and then checks if the number is perfect by summing its divisors. The output shows that 100 is not a perfect number and 6 is.

```
1  #include<stdio.h>
2  int main(){
3
4      int input,sum=0;
5      printf("Input an integer : ");
6      scanf("%d",&input);
7
8      for (int i = 1; i<input; i++)
9      {
10         if(input%i==0){
11             printf("%d ",i);
12             sum +=i;
13         }
14     }
15     if(sum==input){
16         printf("\nThe Number entered is perfect number");
17     }else
18         printf("\nThe Number entered is not perfect number");
19     return 0;
20 }
```

TERMINAL

```
Input an integer : 100
1 2 4 5 10 20 25 50
The Number entered is not perfect number
PS D:\C++ Full Course\Assignment4> ./q7.exe
Input an integer : 6
1 2 3
The Number entered is perfect number
PS D:\C++ Full Course\Assignment4>
```

Q8)

The screenshot shows the Visual Studio Code interface with the following components:

- Explorer Panel:** Displays the project structure for "C++ FULL COURSE". It includes folders for ".vscode", "Assignment2", "Assignment3", and "Assignment4". Under "Assignment4", there are files q1.c through q10.c and their corresponding executables (q1.exe through q10.exe). The file "q8.c" is selected.
- Code Editor:** Shows the content of "q8.c". The code is a C++ program that calculates the factorial of a number using a recursive function.
- Terminal Panel:** Shows the command prompt output. The user has navigated to the directory "d:\C++ Full Course\Assignment4\" and executed the command `gcc q8.c -o q8`. The program has been run, and the output is "Enter number to find Factorial = 5" followed by "The Factorial of 5 is 120".

```
1  #include<stdio.h>
2
3  float fact(int num){
4      float result;
5
6      if(num>0){
7          result= num*(fact(num-1));
8          return result;
9      } else
10         return 1;
11     }
12
13     int main(){
14
15         int input;
16         printf("Enter number to find Factorial = ");
17         scanf("%d",&input);
18
19         float result =fact(input);
20
21         printf("The Factorial of %d is %d",input,(int)result);
22
23         return 0;
24     }
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q8.c -o q8 } ; if ($?) { .\q8 }
Enter number to find Factorial = 5
The Factorial of 5 is 120
PS D:\C++ Full Course\Assignment4>
```

Q9)

The screenshot shows the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer panel on the left shows a folder structure with "Assignment3" and "Assignment4". Under "Assignment4", there are files q1.c through q11.c and their corresponding .exe files. The file "q9.c" is selected and open in the editor. The code in "q9.c" defines a recursive function "powe" to calculate the power of a number. The main function prompts the user for a base and a power, then calls the "powe" function and prints the result. The output of the program is shown in the terminal: "Enter the base of number = 4", "Enter the power of number = 4", and "4 ^ 4 = 256".

```
1  #include <stdio.h>
2  #include<math.h>
3
4  float powe(int num,int power)
5  {
6      return pow(num,power);
7  }
8  int main()
9  {
10     int input,power;
11     printf("Enter the base of number = ");
12
13     scanf("%d", &input);
14     printf("Enter the power of number = ");
15
16     scanf("%d", &power);
17     float result = powe(input,power);
18
19     printf("%d ^ %d = %d ",input,power,(int)result);
20     return 0;
21 }
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q9.c -o q9 } ; if ($?) { .\q9 }
Enter the base of number = 4
Enter the power of number = 4
4 ^ 4 = 256
PS D:\C++ Full Course\Assignment4>
```

Q10)

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

```
void swap(int *a, int *b)
```

```
{
```

```
    *a = *a + *b;
```

```
    *b = *a - *b;
```

```
    *a = *a - *b;
```

```
}
```

```
int main(){
```

```
    int a,b;
```

```
    printf("Enter number 1 = ");
```

```
    scanf("%d",&a);
```

```
    printf("Enter number 2 = ");
```

```
    scanf("%d",&b);
```

```
    printf("\nBefore Swap : number 1 is = %d and number 2 is = %d",a,b);
```

```
swap(&a,&b);
```

```
printf("\nAfter Swap : number 1 is = %d and number 2 is =  
%d",a,b);
```

```
return 0;
```

```
}
```

```
q10.c - C++ Full Course - Visual Studio Code  
EXPLORER  
C++ FULL COURSE  
  Assignment3  
  Assignment4  
    q1.c  
    q1.exe  
    q2.c  
    q2.exe  
    q3.c  
    q3.exe  
    q4.c  
    q4.exe  
    q5.c  
    q5.exe  
    q6.c  
    q6.exe  
    q7.c  
    q7.exe  
    q8.c  
    q8.exe  
    q9.c  
    q9.exe  
    q10.c  
    q10.exe  
    q11.c  
    q11.exe  
  > OUTLINE  
  > TIMELINE  
q4.c q5.c q6.c q7.c q8.c q9.c q10.c  
1 #include<stdio.h>  
2  
3 void swap(int *a, int *b)  
4 {  
5     *a = *a + *b;  
6     *b = *a - *b;  
7     *a = *a - *b;  
8 }  
9  
10 int main(){  
11  
12     int a,b;  
13  
14     printf("Enter number 1 = ");  
15     scanf("%d",&a);  
16  
17     printf("Enter number 2 = ");  
18     scanf("%d",&b);  
19  
20     printf("\nBefore Swap : number 1 is = %d and number 2 is = %d",a,b);  
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```

Q11)

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

```
void swap(int*p,int*q){
```

```
    int temp;
```

```
    temp=*p;
```

```
    *p=*q;
```

```
    *q=temp;
```

```
}
```

```
int main(){
```

```
    int a,b;
```

```
    printf("Enter number 1 = ");
```

```
    scanf("%d",&a);
```

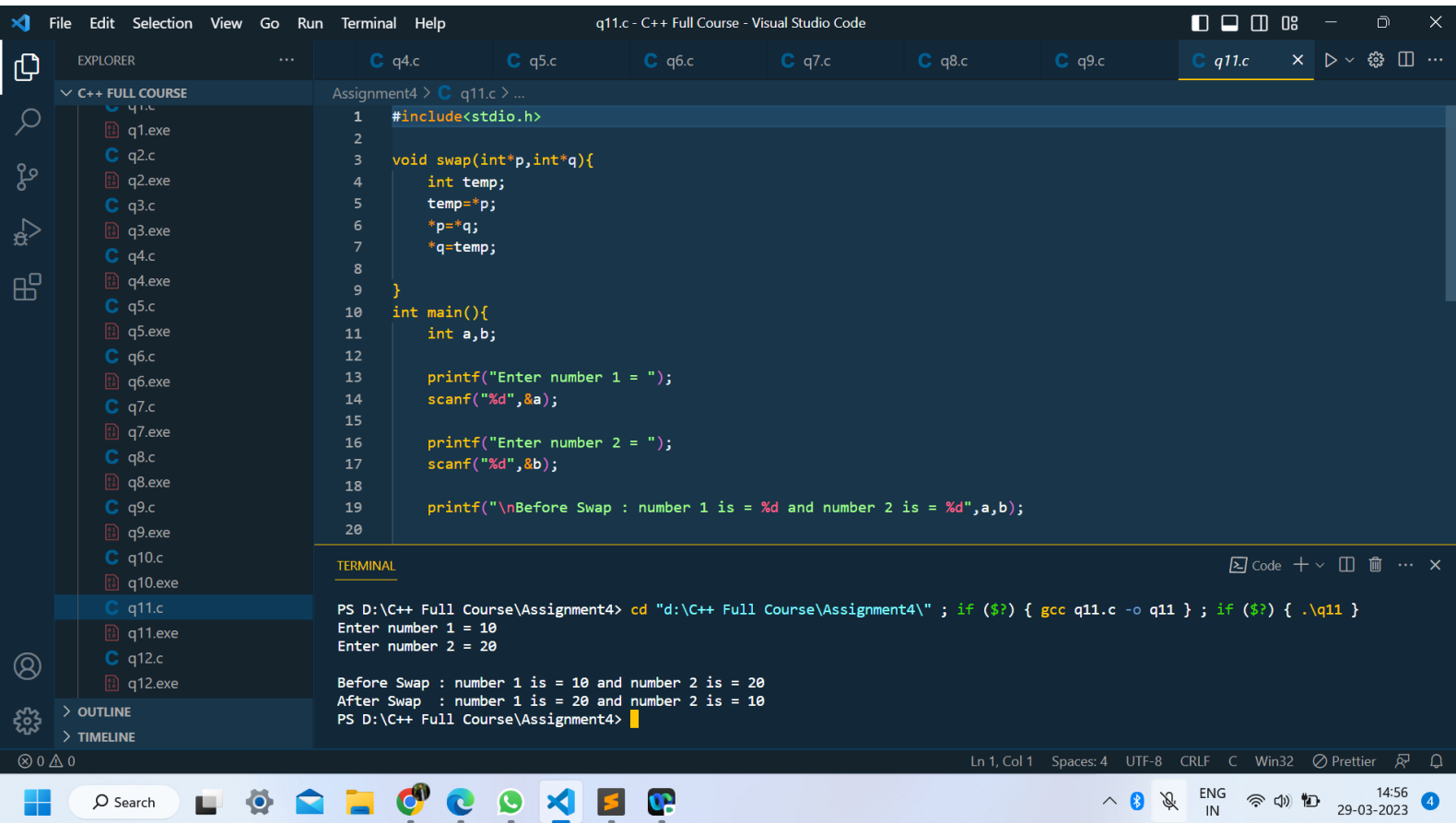
```
    printf("Enter number 2 = ");
```

```
    scanf("%d",&b);
```

```
    printf("\nBefore Swap : number 1 is = %d and number 2 is = %d",a,b);
```

```
    swap(&a,&b);
```

```
printf("\nAfter Swap : number 1 is = %d and number 2 is =  
%d",a,b);  
  
}
```



The screenshot displays the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer panel on the left shows a list of files, including q1.c through q12.c and their corresponding .exe files. The main editor window shows the code for q11.c, which defines a swap function and a main function. The terminal at the bottom shows the execution of the program, which prompts the user to enter two numbers, 10 and 20, and then displays the output: "Before Swap : number 1 is = 10 and number 2 is = 20" and "After Swap : number 1 is = 20 and number 2 is = 10".

```
1 #include<stdio.h>
2
3 void swap(int*p,int*q){
4     int temp;
5     temp=*p;
6     *p=*q;
7     *q=temp;
8 }
9
10 int main(){
11     int a,b;
12
13     printf("Enter number 1 = ");
14     scanf("%d",&a);
15
16     printf("Enter number 2 = ");
17     scanf("%d",&b);
18
19     printf("\nBefore Swap : number 1 is = %d and number 2 is = %d",a,b);
20 }
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q11.c -o q11 } ; if ($?) { .\q11 }
Enter number 1 = 10
Enter number 2 = 20

Before Swap : number 1 is = 10 and number 2 is = 20
After Swap : number 1 is = 20 and number 2 is = 10
PS D:\C++ Full Course\Assignment4>
```

Q12)

The screenshot displays the Visual Studio Code interface with a C++ project named "Assignment4". The Explorer panel on the left shows a directory structure with files q4.c through q13.c and their corresponding executables. The main editor window shows the code for q12.c, which includes `<stdio.h>` and defines a `main` function. The function declares variables `a` (int), `b` (char), `c` (float), and `d` (double), and prints their memory addresses. The TERMINAL panel at the bottom shows the command to compile and run the program, followed by the output of the `printf` statements.

```
1 #include<stdio.h>
2
3 int main(){
4
5     int a=4; char b= 'A'; float c =4.4; double d= 4.4444;
6
7     printf("\nAddress of int    a = %p",&a);
8     printf("\nAddress of char  b = %p",&b);
9     printf("\nAddress of float c = %p",&c);
10    printf("\nAddress of char  d = %p",&d);
11
12    return 0;
13 }
```

TERMINAL

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q12.c -o q12 } ; if ($?) { .\q12 }

Address of int    a = 0061FF1C
Address of char   b = 0061FF1B
Address of float  c = 0061FF14
Address of char   d = 0061FF08
PS D:\C++ Full Course\Assignment4>
```


Q13)

The screenshot displays the Visual Studio Code interface with a C++ project named "C++ FULL COURSE". The Explorer sidebar on the left shows a list of files, including q4.c, q4.exe, q5.c, q5.exe, q6.c, q6.exe, q7.c, q7.exe, q8.c, q8.exe, q9.c, q9.exe, q10.c, q10.exe, q11.c, q11.exe, q12.c, q12.exe, q13.c, and q13.exe. The file q13.c is selected and open in the editor. The code in q13.c is as follows:

```
1 #include<stdio.h>
2
3 int main(){
4
5     int a;
6     int *b;
7
8     printf("Enter the value of a = ");
9     scanf("%d",&a);
10
11     b=&a;
12     printf("The vlaue of a using pointer b is = %d",*b);
13
14     return 0;
15 }
16
```

The TERMINAL panel at the bottom shows the command prompt output:

```
PS D:\C++ Full Course\Assignment4> cd "d:\C++ Full Course\Assignment4\" ; if ($?) { gcc q13.c -o q13 } ; if ($?) { .\q13 }
Enter the value of a = 100
The vlaue of a using pointer b is = 100
PS D:\C++ Full Course\Assignment4>
```

The status bar at the bottom indicates the current line and column (Ln 1, Col 1), the number of spaces (Spaces: 4), the encoding (UTF-8), the line ending (CRLF), the architecture (Win32), and the theme (Prettier). The system tray at the bottom right shows the date and time (14:57 29-03-2023).