CS-114 Fundamentals of programming

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Assignment of manual 1 & 2

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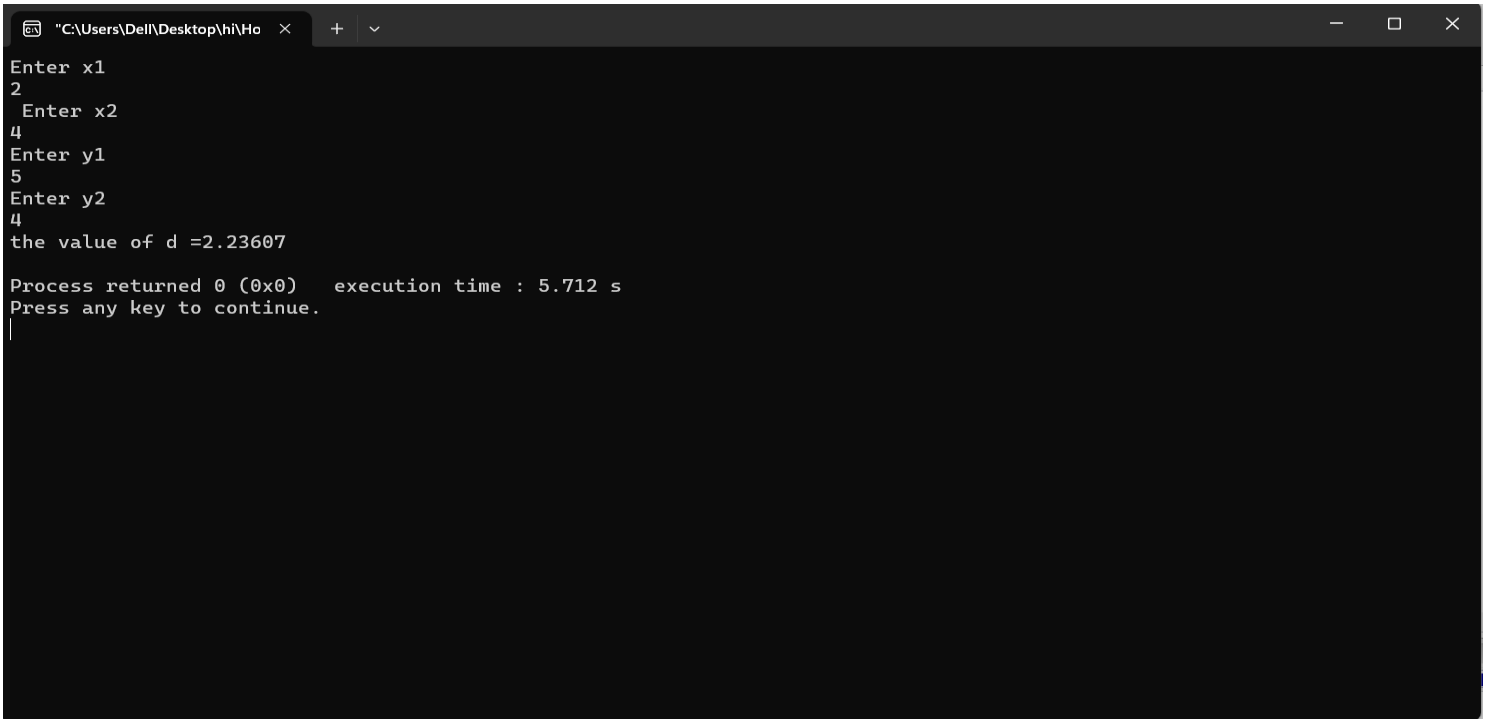
Manual 1

QUESTION 1

```cpp
// Question 1:Write a C++ program to calculate distance between two points. The values of coordinates should be input by user. D= sqrt((x2 -x1)*(x2-x1) + (y2-y1)*(y2-y1)).


#include <iostream>
#include <cmath> //Library used for sqrt function

using namespace std;

int main()
{
float x1, x2, y1, y2,d ; //declaring variables

//Input value for the user
cout<< "Enter x1" << endl;
cin>> x1;
cout<<" Enter x2" << endl;
cin>> x2;
cout<< "Enter y1" << endl;
cin>> y1;
cout<< "Enter y2" << endl;
cin>> y2;

// Applying the distance formula
d= sqrt((x2 - x1)*(x2-x1) + (y2-y1)*(y2-y1));

//Display the result
cout<<"the value of d =" <<d << endl;

return 0;


}
```

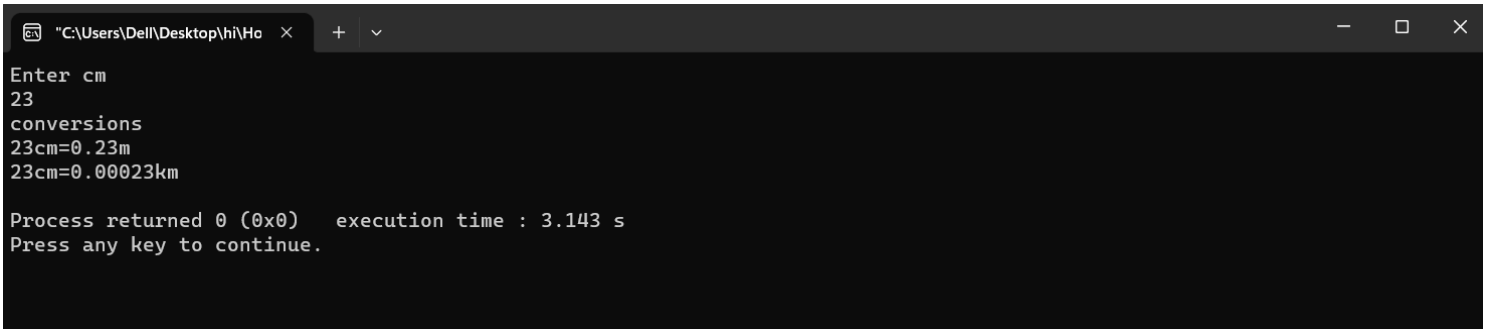
ANSWER 1



QUESTION 2

```cpp
// Question 2:Write a code in C++ to take length from user in centimeter and convert it into meter and kilometer.

#include <iostream>

using namespace std;

int main()
{
float cm,m,km ; //declaring variables

//Input value for the user
cout << "Enter cm" << endl;
cin>> cm;

// Converting m & km to cm
m= cm / 100.0;
km= cm/100000.0;

//Display the results
cout << "conversions" << endl;
cout << cm << "cm=" <<  m << "m" << endl;
cout << cm << "cm=" << km << "km" << endl;

return 0;


}
```

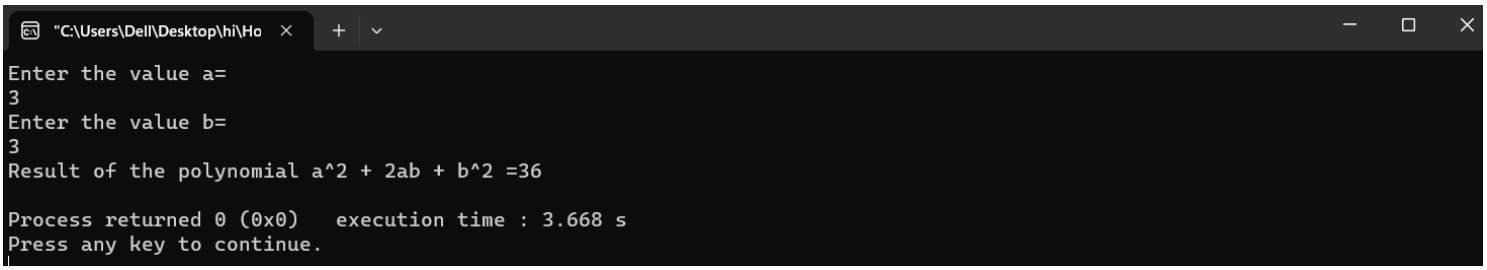
ANSWER 2



QUESTION 3

```cpp
// Question 3:Write a code in C++ that takes values of a and b from the user and displays result of polynomial a^2 + 2ab + b^2.


#include<iostream>

using namespace std;

int main()

{
   float a,b; //declaring variables

//Input value for the user
cout<< "Enter the value a=" << endl;
cin >> a;

cout<< "Enter the value b=" << endl;
cin>> b;

//applying the polynomial formula

float result = a*a + 2*a*b + b*b;

//Display the results
cout << "Result of the polynomial a^2 + 2ab + b^2 =" << result<< endl;

return 0;
}
```

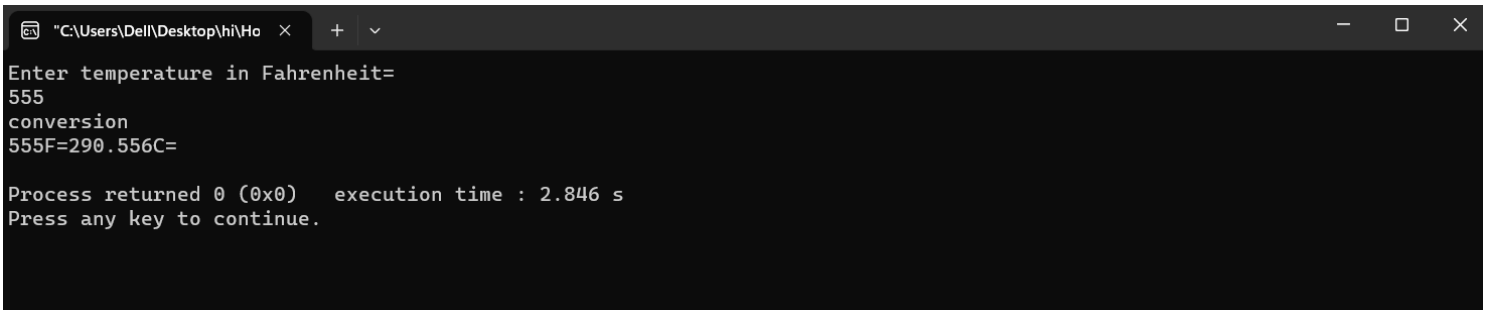
ANSWER 3



QUESTION 4

```cpp
// Question 4:Write a program in C++ to convert temperature in Fahrenheit to Celsius.

#include <iostream>

using namespace std;

int main()
{
    float F, C; //declaring variables

    //Input value for the user
    cout << "Enter temperature in Fahrenheit="<< endl;
    cin >> F;

    //Applying formula to convert Fahrenheit to Celsius

    C = (F - 32) * 5/9;

    //Display the results
    cout << "conversion" << endl;
    cout << F << "F=" << C << "C=" << endl;

    return 0;


}
```

ANSWER 4

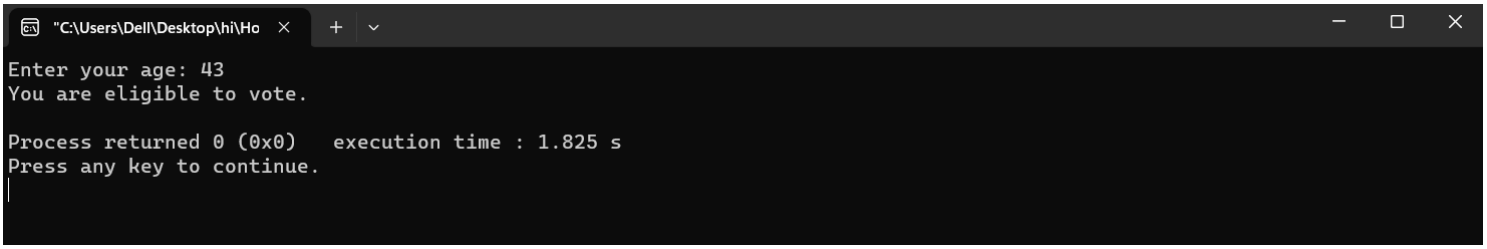


Manual 2

QUESTION 1

```cpp
    //Manual 2:

    //Question 1: 1. Write a program that determines if a person is eligible to vote based on their age (e.g., 18 years or older) using logical operators.

   #include <iostream>

   using namespace std; // Add this line

   int main() {
   int age;

    // Prompt the user to enter their age
    cout << "Enter your age: ";
    cin >> age;

    // Check if the person is eligible to vote
    if (age >= 18) {
        cout << "You are eligible to vote.\n";
    } else {
        cout << "You are not eligible to vote.\n";
    }

    return 0;
}
```

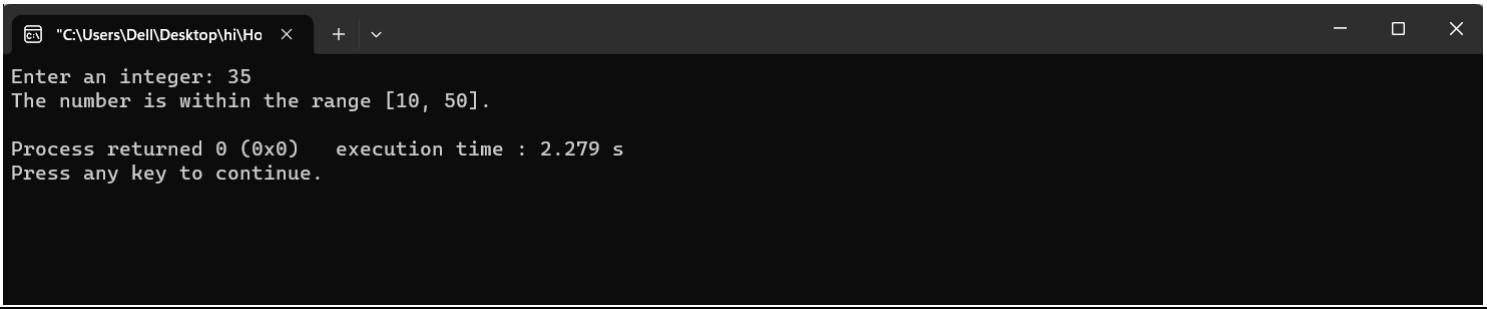
ANSWER 1



QUESTION 2

```cpp
    //Question 2: Write a program that takes an integer as input and checks if it falls within the range [10, 50] using logical operators

    #include <iostream>

using namespace std;

int main() {
    int number;

    // Prompt the user to enter an integer
    cout << "Enter an integer: ";
    cin >> number;

    // Check if the number falls within the range [10, 50]
    if (number >= 10 && number <= 50) {
        cout << "The number is within the range [10, 50].\n";
    } else {
        cout << "The number is outside the range [10, 50].\n";
    }

    return 0;
}
```

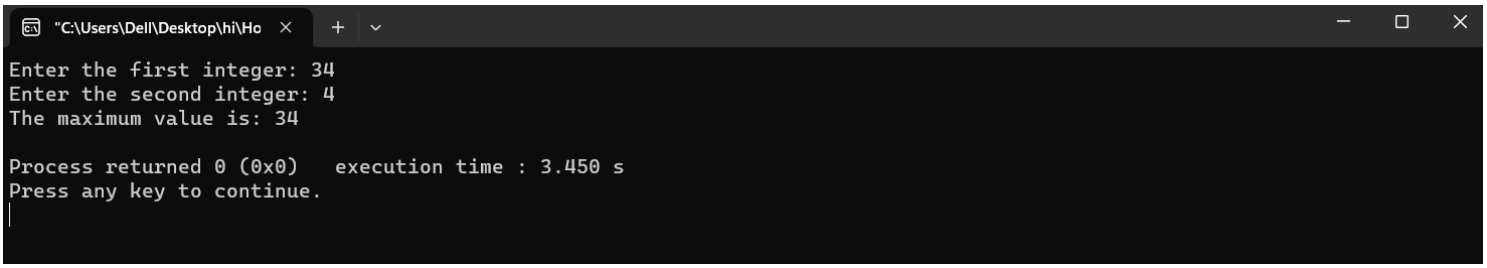
ANSWER 2



QUESTION 3

```cpp
//Question 3: Write a C++ program to compare two integers and find the maximum value.

#include <iostream>

using namespace std;

int main() {
int num1, num2;

// Prompt the user to enter two integers
cout << "Enter the first integer: ";
cin >> num1;
cout << "Enter the second integer: ";
cin >> num2;

int maxNumber;

if (num1 > num2) {
    maxNumber = num1;
} else {
    maxNumber = num2;
}

cout << "The maximum value is: " << maxNumber << endl;

return 0;
}
```

ANSWER 3



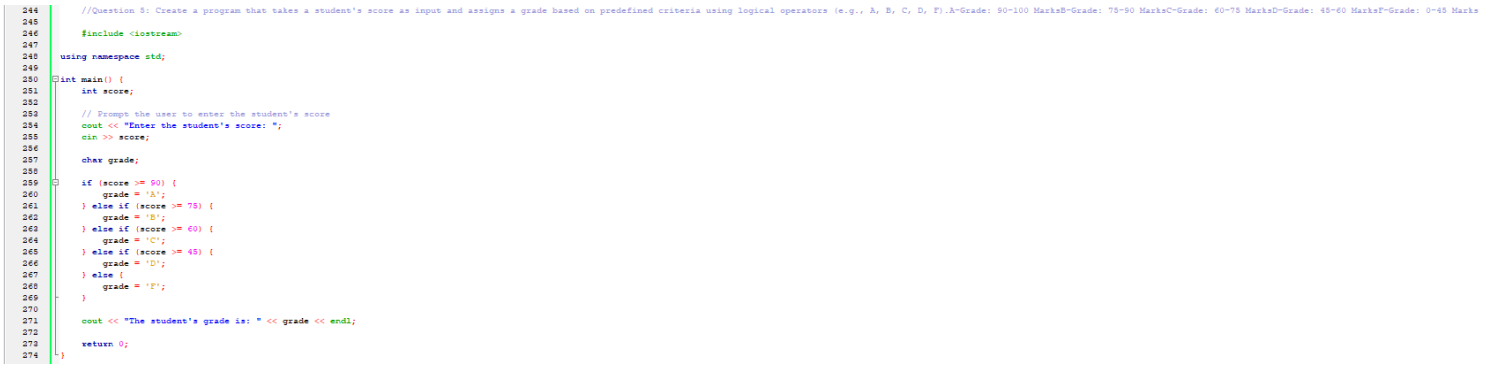
QUESTION 4

```cpp
//Question 4: Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average >= 60)

#include <iostream>

using namespace std;

int main() {
float score1, score2, score3;
float average;

// Prompt the user to enter three exam scores
cout << "Enter the first exam score: ";
cin >> score1;
cout << "Enter the second exam score: ";
cin >> score2;
cout << "Enter the third exam score: ";
cin >> score3;

// Calculate the average score
average = (score1 + score2 + score3) / 3.0f;  // Use 3.0f to ensure float division

// Determine if the average is above a passing grade (e.g., 60)
if (average >= 60.0f) {
    cout << "Average score is " << average << " - You passed!\n";
} else {
    cout << "Average score is " << average << " - You failed.\n";
}

return 0;
}
```

ANSWER 4

```
"C:\Users\Dell\Desktop\hi\Ho
Enter the first exam score: 77
Enter the second exam score: 88
Enter the third exam score: 7
Average score is 57.3333 - You failed.

Process returned 0 (0x0)   execution time : 6.005 s
Press any key to continue.
```

QUESTION 5



```
//Question 5: Create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F).A-Grade: 90-100 MarksB-Grade: 75-90 MarksC-Grade: 60-75 MarksD-Grade: 45-60 MarksF-Grade: 0-45 Marks

#include <iostream>

using namespace std;

int main() {
    int score;

    // Prompt the user to enter the student's score
    cout << "Enter the student's score: ";
    cin >> score;

    char grade;

    if (score >= 90) {
        grade = 'A';
    } else if (score >= 75) {
        grade = 'B';
    } else if (score >= 60) {
        grade = 'C';
    } else if (score >= 45) {
        grade = 'D';
    } else {
        grade = 'F';
    }

    cout << "The student's grade is: " << grade << endl;

    return 0;
}
```

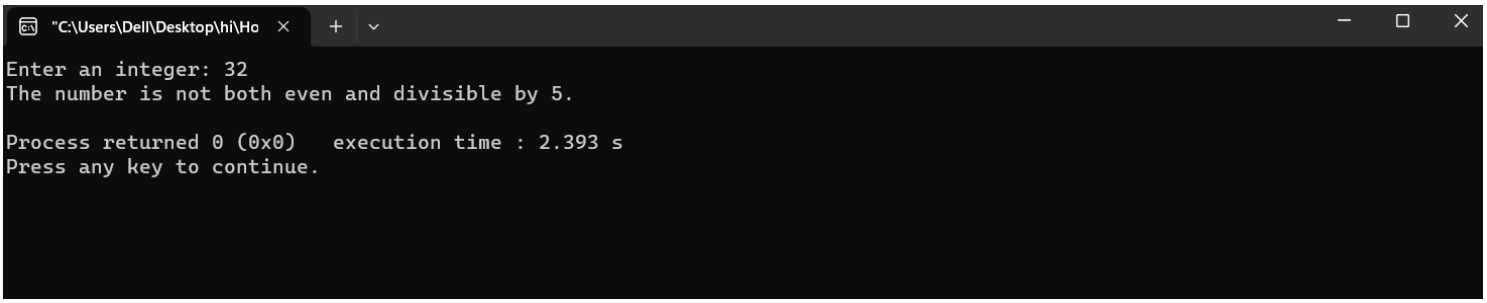
ANSWER 5

```
"C:\Users\Dell\Desktop\hi\Ho
Enter the student's score: 77
The student's grade is: B

Process returned 0 (0x0)   execution time : 2.522 s
Press any key to continue.
```

QUESTION 6

```
//Question 6: Write a program that takes an integer as input and determines if it is both even and divisible by 5.

#include <iostream>

using namespace std;

int main() {
    int number;

    // Prompt the user to enter an integer
    cout << "Enter an integer: ";
    cin >> number;

    if (number % 2 == 0 && number % 5 == 0) {
        cout << "The number is both even and divisible by 5.\n";
    } else {
        cout << "The number is not both even and divisible by 5.\n";
    }

    return 0;
}
```

ANSWER 6



QUESTION 7

```cpp
//Question 7: Create a C++ program that checks if a user-provided year is a leap year.

#include <iostream>

using namespace std;

int main() {
int year;

// Prompt the user to enter a year
cout << "Enter a year: ";
cin >> year;

if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
    cout << year << " is a leap year.\n";
} else {
    cout << year << " is not a leap year.\n";
}

return 0;
}
```

ANSWER 7

QUESTION 8

```cpp
//Question 8: Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA >= 3.5) and attendance (must have attended at least 80% of classes)

#include <iostream>

using namespace std;

int main() {
float gpa;
float attendancePercentage;

// Prompt the user to enter GPA and attendance percentage
cout << "Enter your GPA: ";
cin >> gpa;
cout << "Enter your attendance percentage: ";
cin >> attendancePercentage;

if (gpa >= 3.5f && attendancePercentage >= 80.0f) {  //"f" to ensure float comparisons
    cout << "You are eligible for a scholarship.\n";
} else {
    cout << "You are not eligible for a scholarship.\n";
}

return 0;
}
```

ANSWER 8

QUESTION 9

```cpp
    //Question 9: Write a program that checks if a given character is a vowel (a, e, i, o, u) or a consonant using logical operators.

    #include <iostream>

using namespace std;

int main() {
    char character;

    // Prompt the user to enter a character
    cout << "Enter a character: ";
    cin >> character;

    // Check if the character is a vowel
    if (character == 'a' || character == 'e' || character == 'i' || character == 'o' || character == 'u' ||
        character == 'A' || character == 'E' || character == 'I' || character == 'O' || character == 'U') {
        cout << character << " is a vowel.\n";
    } else {
        cout << character << " is a consonant.\n";
    }

    return 0;
}
```

ANSWER 9