Problem 1 Write a complete program that asks the user to enter an integer n. If the value of n is greater than or equal to 10 and less than or equal to 99 the program should print a line of n stars. Otherwise it should say Hello. Here is a sample to show how the program runs.

Enter the value of n: 17
***************

Answer:

```cpp
#include <iostream>
using namespace std;

int main() {
    int n;
    cout << "Enter the value of n: ";
    cin >> n;
    if (n >= 10 && n <= 99)
        for (int c = 0; c < n; c++)
            cout << "*";
    else cout << "Hello";
    cout << endl;
    return 0;
}
```
Problem 2  Write C++ statements to carry out the following tasks. Do not write complete programs. Each answer should be at most 2 lines of C++. Assume the following variables have been declared and initialized with positive values.

```cpp
int x, y;
```

(a) Input a new value for x that is typed by the user.

Answer:

```cpp
cout << "Enter the value of x ";
cin >> x;
```

(b) Print the values of x and y separted by a comma.

Answer:

```cpp
cout << x << ", " << y << endl;
```

(c) Print the remainder when x * x is divided by y.

Answer:

```cpp
cout << (x * x) % y << endl;
```

(d) Repeatedly multiply y by 2 until it is larger than 1000.

Answer:

```cpp
while (y <= 1000) y = y * 2;
```

(e) Print the last digits of the first 80 squares. The output starts 14965 from the last digits of 1, 4, 9, 16, 25.

Answer:

```cpp
for (int i = 1; i <= 80; i++) cout << i * i % 10;
```
Problem 3  
Consider the following C++ program.

```cpp
int main() {
    int x = 10, y = 10, z = 11;
    string name = "freddy";

    cout << ((x/3) * 10.0) / 4 << endl;  // line (a)
    cout << (17 % 5) % 2 + 20 << endl;    // line (b)
    if (x > y && x < z)                    // line (c)
        cout << x << endl;
    else cout << "Hello" << endl;
    if (z > y || name == "Freddy")        // line (d)
        cout << "Goodbye" << endl;
    else cout << 12 << endl;
    for (x = 1; x < 4; x++)                // line (e)
        for (y = 3; y < 5; y++)
            cout << x << y << endl;
    return 0;
}
```

(a) What is the output from the instruction beginning on line (a)?

Answer:

7.5

(b) What is the output from the instruction beginning on line (b)?

Answer:

20

(c) What is the output from the instruction beginning on line (c)?

Answer:

Hello

(d) What is the output from the instruction beginning on line (d)?

Answer:

Goodbye

(e) What is the output from the instruction beginning on line (e)?

Answer:

13142324334
Problem 4  The following program prints output with 5 square blocks arranged as in the following diagram.

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

Some pieces of code have been replaced by PART (a), PART (b), and so on. To answer the 5 parts of this question you should supply the C++ code that was replaced. Each answer must fit on a single line.

```c++
int main() {
    for (int row = 1; row <= 5; row++) {
        for (int block = 1; block <= PART (a); block++) {
            for (int col = 1; col <= PART (b); col++)
                cout << PART (c);
            cout << PART (d);
        }
        cout << PART (e);
    }
    return 0;
}
```

(a) Give a replacement for PART (a)

**Answer:** PART (a) is **row**

(b) Give a replacement for PART (b)

**Answer:** PART (b) is **6 - block**

(c) Give a replacement for PART (c)

**Answer:** PART (c) is **"*"**

(d) Give a replacement for PART (d)

**Answer:** PART (d) is **" "**

(e) Give a replacement for PART (e)

**Answer:** PART (e) is **endl**
Problem 1 Write a complete program that asks the user to enter a string name. If the value of name is either Freddy or Fred the program should say Goodbye. Otherwise it should print a line with 101 stars. Here is a sample to show how the program runs.

Enter a name: Freddy
Goodbye

Answer:

```cpp
#include <iostream>
using namespace std;

int main() {
    string name;
    cout << "Enter a name: ";
    cin >> name;
    if (name == "Freddy" || name == "Fred") cout << "Goodbye";
    else for (int c = 0; c < 101; c++)
        cout << "*";
    cout << endl;
    return 0;
}
```
Problem 2  Write C++ statements to carry out the following tasks. Do not write complete programs. Each answer should be at most 2 lines of C++. Assume the following variables have been declared and initialized with positive values.

```cpp
int x, y, z;
```

(a) Input new values for y and z that are typed by the user.

Answer:

```cpp
cout << "Enter the values of y and z ";
cin >> y >> z;
```

(b) Print the values of x, y and z separated by spaces.

Answer:

```cpp
cout << x << " " << y << " " << z << endl;
```

(c) Print the remainder when y is divided by x.

Answer:

```cpp
cout << y % x << endl;
```

(d) Repeatedly add x to y until y becomes larger than 100.

Answer:

```cpp
while (y <= 100) y = y + x;
```

(e) Print the first 2 digits of y.

Answer:

```cpp
while (y >= 100) y = y / 10;
cout << y;
```
Problem 3  Consider the following C++ program.

```c++
int main() {
    int x = 11, y = 10, z = 9;
    string name = "freddy";

    cout << ((x/4) * 10.0) / 8 << endl; // line (a)
    cout << (17 % 7) % 2 + 10 << endl;  // line (b)
    if (x > y && x < z) // line (c)
        cout << x << endl;
    else cout << "Hello" << endl;
    if (z > y || name == "Freddy") // line (d)
        cout << "Goodbye" << endl;
    else cout << 13 << endl;
    for (x = 3; x < 6; x++) { // line (e)
        for (y = 1; y < 3; y++)
            cout << x << y << endl;
    }
    return 0;
}
```

(a) What is the output from the instruction beginning on line (a)?

**Answer:**

2.5

(b) What is the output from the instruction beginning on line (b)?

**Answer:**

11

(c) What is the output from the instruction beginning on line (c)?

**Answer:**

Hello

(d) What is the output from the instruction beginning on line (d)?

**Answer:**

13

(e) What is the output from the instruction beginning on line (e)?

**Answer:**

3132
4142
5152
Problem 4 The following program prints output with 6 square blocks arranged as in the following diagram.

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

Some pieces of code have been replaced by PART (a), PART (b), and so on. To answer the 5 parts of this question you should supply the C++ code that was replaced. Each answer must fit on a single line.

```
int main() {
    for (int row = 6; row >= 1; row--) {
        for (int block = 1; block <= PART (a); block++) {
            for (int col = 1; col <= PART (b); col++)
                cout << PART (c);
            cout << PART (d);
        }
        cout << PART (e);
    }
    return 0;
}
```

(a) Give a replacement for PART (a)
Answer: PART (a) is row
(b) Give a replacement for PART (b)
Answer: PART (b) is 7 - block
(c) Give a replacement for PART (c)
Answer: PART (c) is *
(d) Give a replacement for PART (d)
Answer: PART (d) is " 
(e) Give a replacement for PART (e)
Answer: PART (e) is endl