

Solutions

09.00am – 09.50am, Wednesday, March 22, 2017

Problem 1 (10 points) The following C++ program has errors at the lines marked a,b,c,d, and e. For each answer write a single line of C++ that fixes the errors in the corresponding line.

```
#include <iostream>
    using namespace std          // line a

int main();                      // line b

{   int x = 1;

    while (0 < x < 5) {          // line c
        cout >> x % x >> "\n\n" // line d
        x = x++;                // line e
    }
    return 0;
}
```

(a) Correct line (a):

Answer:

```
using namespace std;           // line a
```

(b) Correct line (b):

Answer:

```
int main()                     // line b
```

(c) Correct line (c):

Answer:

```
while (0 < x && x < 5) {       // line c
```

(d) Correct line (d):

Answer:

```
cout << x % x << "\n\n";      // line d
```

(e) Correct line (e):

Answer:

```
x++;                            // line e
```

Problem 2 (10 points)

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. No answer can use more than two lines. Assume that an integer variable x has been declared.

(a) Prompt the user to enter a value for x .

Answer:

```
cout << "Enter a value for x:";
```

(b) Read the value of x given by the user

Answer:

```
cin >> x;
```

(c) If x is negative, replace x by the value of $5 - x$

Answer:

```
if (x < 0) x = 5 - x;
```

(d) Print the square root of x .

Answer:

```
cout << sqrt(x) << endl;
```

(e) On one output line, print x random numbers in the range 10 to 17 (inclusive)

Answer:

```
for (int n = 1; n <= x; n++) cout << 10 + rand() % 8 << " ";
```

Problem 3 (10 points) Consider the following C++ program.

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

string fun(int x) {
    if (x < 0) return "Negative ";
    if ((x > 10) && (x < 100)) return "Big ";
    return "x + x ";
}

int main() {
    int a = 4, b = 3;

    cout << a << b << a << "b" << endl;           // line (a)

    cout << (a * b) % 10 << endl;                 // line (b)

    for (int n = 4; n <= 6; n++) cout << n + b;   // line (c)
    cout << endl;

    cout << fun(-1) << endl;                       // line (d)

    cout << fun(200) << endl;                     // line (e)

    return 0;
}
```

(a) What is the output at line (a)?

Answer:

434b

(b) What is the output at line (b)?

Answer:

2

(c) What is the output at line (c)?

Answer:

789

(d) What is the output at line (d)?

Answer:

Negative

(e) What is the output at line (e)?

Answer:

x + x

Problem 4 (10 points) Write a complete C++ program that asks the user to enter a positive integer n . If n is not positive the program should exit immediately. Otherwise the program should print a square with n rows that is cut by its diagonal (from upper left to lower right) into a lower triangle showing the symbol \$ and an upper triangle showing the symbol =.

For example, if the user specified 5 for n , the program would print as follows:

```
$====  
$$===  
$$$==  
$$$$=  
$$$$$
```

Answer:

```
#include <iostream>  
using namespace std;  
  
int main() {  
    int n;  
    cout << "Enter a positive integer n: ";  
    cin >> n;  
    if (n <= 0) return 0;  
    for (int r = 1; r <= n; r++) {  
        for (int c = 1; c <= n; c++)  
            if (c <= r) cout << "$";  
            else cout << "=";  
        cout << endl;  
    }  
    return 0;  
}
```

Solutions

02.45pm – 03.35pm, Wednesday, March 22, 2017

Problem 1 (10 points) The following C++ program has errors at the lines marked a,b,c,d, and e. For each answer write a single line of C++ that fixes the errors in the corresponding line.

```
#include <iostream>
Using      namespace std;           // line a

int main{}                           // line b

{   int x = 5;

    while (0 < x - 1 < 5) {          // line c
        cout >> x / (x + x % 1) endl // line d
        x = x--;                     // line e
    }
    return 0;
}
```

(a) Correct line (a):

Answer:

```
using namespace std;                // line a
```

(b) Correct line (b):

Answer:

```
int main()                          // line b
```

(c) Correct line (c):

Answer:

```
while (0 < x - 1 && x - 1 < 5) {     // line c
```

(d) Correct line (d):

Answer:

```
cout << x / (x + x % 1) << "\n\n"; // line d
```

(e) Correct line (e):

Answer:

```
x--;                                 // line e
```

Problem 2 (10 points)

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. No answer can use more than two lines. Assume that an integer variables x and y have been declared.

(a) Prompt the user to enter positive values for x and y.

Answer:

```
cout << "Enter values for x and y:";
```

(b) Read the values of x and y given by the user

Answer:

```
cin >> x >> y;
```

(c) If x or y is not positive, exit the program

Answer:

```
if ((x <= 0) || (y <= 0)) return 0;
```

(d) Print the square root of x + y.

Answer:

```
cout << sqrt(x + y) << endl;
```

(e) On one output line, print x random numbers in the range 1 to y (inclusive)

Answer:

```
for (int n = 1; n <= x; n++) cout << 1 + rand() % y << " ";
```

Problem 3 (10 points) Consider the following C++ program.

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

string fun(int x) {
    if (x < 0) return "Negative ";
    if ((x > 5) || (x < 1)) return "Big ";
    return "x % x";
}

int main() {
    int a = 4, b = 3;

    cout << "a" << "b" << endl; // line (a)

    cout << (a + b) % 10 << endl; // line (b)

    for (int n = 6; n >= 4; n--) cout << n - b; // line (c)
    cout << endl;

    cout << fun(-1) << endl; // line (d)

    cout << fun(20) << endl; // line (e)

    return 0;
}
```

(a) What is the output at line (a)?

Answer:

ab

(b) What is the output at line (b)?

Answer:

7

(c) What is the output at line (c)?

Answer:

321

(d) What is the output at line (d)?

Answer:

Negative

(e) What is the output at line (e)?

Answer:

Big

Problem 4 (10 points) Write a complete C++ program that asks the user to enter a positive integer n . If n is not positive the program should exit immediately. Otherwise the program should print a square with n rows. The square is cut by the diagonal (from lower left to upper right) into two triangles. The lower triangle should be made from the symbol \$ and an upper triangle from the symbol =.

For example, if the user specified 5 for n , the program would print as follows:

```
=====  
====$  
===$$  
==$$$  
=$$$$
```

Answer:

```
#include <iostream>  
using namespace std;  
  
int main() {  
    int n;  
    cout << "Enter a positive integer n: ";  
    cin >> n;  
    if (n <= 0) return 0;  
    for (int r = n; r >= 1; r--) {  
        for (int c = 1; c <= n; c++)  
            if (c <= r) cout << "=";  
            else cout << "$";  
        cout << endl;  
    }  
    return 0;  
}
```