QUEENS COLLEGE Department of Computer Science
CSCI 111 Midterm 1, version A Exam Fall 2014 10.14.14

Solutions

09.00am – 09.50am, Tuesday, October 14, 2014

Problem 1 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 21.

2. It repeatedly reads n from the user until the supplied value of n is legal.

3. It prints out a picture of an $n \times n$ square formed of X characters except that a diagonal stripe, formed by the diagonal and any position immediately to its right, is printed using an O character.

Here is an example of how the program should work:

```
Give me an integer between 1 and 21:   5
OOXXX
XOOXX
XXOOX
XXXOO
XXXXO
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 21:";
   cin >> n;

   while (n < 1 || n > 21) {
      cout << "Illegal.  Try again: ";
      cin >> n;
   }

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= n; c++)
         if ((c == r) || (c == r + 1)) cout << "O";
         else cout << "X";
      cout << endl;
   }
   return 0;
}
```

Problem 2 A number is called *evil* if its last two digits add to 13. Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 666.

2. It terminates when given illegal input.

3. It prints out whether n is evil.

Here is an example of how the program should work:

```
Give me an integer greater than 666: 667

Evil
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 666:";
   cin >> n;

   if (n < 10) return 0;
   int lastDigit = n % 10;
   n = n / 10;
   int nextLast = n % 10;
   if ((lastDigit + nextLast) == 13) cout << "Evil\n";
   else cout << "Not evil\n";
   return 0;
}
```

Problem 3 Consider the following C++ program.

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

int main() {
    int x = 31;
    cout << x % 10 << endl;                  // line (a)
    cout << x / 10 << endl;                  // line (b)
    if (x > 50) cout << "Big" << endl;       // line (c)
    cout << endl;
    while (x > 0) { cout << "1";  x /= 10;}  // line (d)
    cout << endl;
    cout << x * x << endl;                   // line (e)
}
```

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

Answer:

```
1
```

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

Answer:

```
3
```

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

Answer:

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

Answer:

```
11
```

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

Answer:

```
0
```

Problem 4

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized with positive values.

```
int x, y;
```

(a) Read a new value for y and then for x from the user.

Answer:

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

(b) Print y copies of the number x on a single line of output.

Answer:

```
for (int c = 1; c <= y; c++) cout << x;
cout << endl;
```

(c) Print 75.0% on a single line.

Answer:

```
cout << "75.0%" << endl;
```

(d) Replace y by the absolute value of - x - y.

Answer:

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

(e) If y is greater than 10, print the second digit of y

Answer:

```
while (y > 100) {
   y = y / 10;
}
if (y > 10) cout << y % 10 << endl;
```

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CSCI 111 Midterm 1, version B Exam Fall 2014 10.14.14

Solutions

09.00am – 09.50am, Tuesday, October 14, 2014

Problem 1 A number is called *flat* if its last two digits are equal. Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 9.
2. It terminates when given illegal input.
3. It prints out whether n is flat.

Here is an example of how the program should work:

```
Give me an integer greater than 9:  95424

Not flat
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 9:";
   cin >> n;

   if (n < 10) return 0;
   int lastDigit = n % 10;
   n = n / 10;
   int nextLast = n % 10;
   if (lastDigit == nextLast) cout << "Flat\n";
   else cout << "Not flat\n";
   return 0;
}
```

Problem 2 Consider the following C++ program.

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

int main() {
    int x = 5432;
    cout << x % 10 << endl;                  // line (a)
    cout << x / 10 << endl;                  // line (b)
    if (x > 5000) cout << "Big" << endl;     // line (c)
    cout << endl;
    while (x > 0) { cout << "A";  x /= 10;}  // line (d)
    cout << endl;
    cout << x - 5 << endl;                   // line (e)
}
```

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

Answer:

```
2
```

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

Answer:

```
543
```

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

Answer:

```
Big
```

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

Answer:

```
AAAA
```

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

Answer:

```
-5
```

Problem 3

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized with positive values.

```
int x, y;
```

(a) Print y copies of the word Hello on a single line of output.

Answer:

```
for (int c = 1; c <= y; c++) cout << "Hello ";
cout << endl;
```

(b) Print the value of x as a percentage of y, with output like 75.0%.

Answer:

```
cout << 100.0 * x / y << "%" << endl;
```

(c) Read new values for x and y from the user.

Answer:

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

(d) Replace y by its absolute value.

Answer:

```
if (y < 0) y = -y;
```

(e) Print the first digit of y

Answer:

```
   while (y > 10) {
      y = y / 10;
   }
   cout << y << endl;
```

Problem 4 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 15.

2. It terminates at once if the user enters an illegal value for n.

3. It prints out a picture using (+ signs) of a diagonal line that extends over n rows and has a width of 3 characters in each row.

Here is an example of how the program should work:

```
Give me an integer between 1 and 15:   6
+++
 +++
  +++
   +++
    +++
     +++
      +++
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 15:";
   cin >> n;

   if (n < 1 || n > 15) return 0;

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= n + 2; c++)
         if ((c >= r) && (c <= (r + 2))) cout << "+";
         else cout << " ";
      cout << endl;
   }
   return 0;
}
```

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Solutions

09.00am – 09.50am, Tuesday, October 14, 2014

Problem 1 Consider the following C++ program.

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

int main() {
    int x = 123;
    cout << x % 10 << endl;                  // line (a)
    cout << x / 10 << endl;                  // line (b)
    if (x > 50) cout << "Big" << endl;       // line (c)
    cout << endl;
    while (x > 0) { cout << "1";  x /= 10;}  // line (d)
    cout << endl;
    cout << x << endl;                       // line (e)
}
```

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

Answer:

```
3
```

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

Answer:

```
12
```

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

Answer:

```
Big
```

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

Answer:

```
111
```

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

Answer:

```
0
```

Problem 2

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized with positive values.

```
int x, y;
```

(a) Print x copies of the number y on a single line of output.

Answer:

```
for (int c = 1; c <= x; c++) cout << y;
cout << endl;
```

(b) Print the value of y as a percentage of x, with output like 75.0%.

Answer:

```
cout << 100.0 * y / x << "%" << endl;
```

(c) Read a new value for y and then for x from the user.

Answer:

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

(d) Replace y by the absolute value of x - y.

Answer:

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

(e) If y is greater than 10, print the second digit of y

Answer:

```
while (y > 100) {
   y = y / 10;
}
if (y > 10) cout << y % 10 << endl;
```

Problem 3 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 15.

2. It repeatedly reads n from the user until the supplied value of n is legal.

3. It prints out a picture of an $n \times n$ square formed of O characters except that a diagonal stripe, formed by the diagonal and any position immediately to its left, is left blank.

Here is an example of how the program should work:

```
Give me an integer between 1 and 15:   6
 OOOOO
  OOOO
O  OOO
OO  OO
OOO  O
OOOO
```

Answer:

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

```
int main() {
   int n;
   cout << "Give me an integer between 1 and 15:";
   cin >> n;

   while (n < 1 || n > 15) {
      cout << "Illegal.  Try again: ";
      cin >> n;
   }

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= n; c++)
         if ((c == r) || (c == r - 1)) cout << " ";
         else cout << "O";
      cout << endl;
   }
   return 0;
}
```

Problem 4 A number is called *lucky* if the product of its last two digits ends in a 3. Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 666.
2. It terminates when given illegal input.
3. It prints out whether n is lucky.

Here is an example of how the program should work:

```
Give me an integer greater than 666: 697

Lucky
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 666:";
   cin >> n;

   if (n < 10) return 0;
   int lastDigit = n % 10;
   n = n / 10;
   int nextLast = n % 10;
   if ((lastDigit * nextLast) % 10 == 3)
     cout << "Lucky\n";
   else cout << "Not lucky\n";
   return 0;
}
```

QUEENS COLLEGE Department of Computer Science
CSCI 111 Midterm 1, version D Exam Fall 2014 10.14.14

Solutions

09.00am – 09.50am, Tuesday, October 14, 2014

Problem 1

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized with positive values.

```
int x, y;
```

(a) Read new values for x and y from the user.

Answer:

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

(b) Print the value of x as a percentage of y, with output like 75.0%.

Answer:

```
cout << 100.0 * x / y << "%" << endl;
```

(c) Print x copies of the word *cin* on a single line of output.

Answer:

```
for (int c = 1; c <= y; c++) cout << "cin";
cout << endl;
```

(d) Replace y by the absolute value of x.

Answer:

```
if (x < 0) y = -x;
else y = x;
```

(e) Print the first digit of y

Answer:

```
while (y > 10) {
   y = y / 10;
}
cout << y << endl;
```

Problem 2 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 21.
2. It terminates at once if the user enters an illegal value for n.
3. It prints out a picture using (+ signs) of left sloping diagonal line with length n.

Here is an example of how the program should work:

```
Give me an integer between 1 and 21:   5
    +
   +
  +
 +
+
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 21:";
   cin >> n;

   if (n < 1 || n > 21) return 0;

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= n; c++)
         if ( (c + r) == (n + 1)) cout << "+";
         else cout << " ";
      cout << endl;
   }
   return 0;
}
```

Problem 3 A number is called *upward* if its last digit is greater than the previous digit. Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 9.
2. It terminates when given illegal input.
3. It prints out whether n is upward.

Here is an example of how the program should work:

```
Give me an integer greater than 9:  95424

Upward
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 9:";
   cin >> n;

   if (n < 10) return 0;
   int lastDigit = n % 10;
   n = n / 10;
   int nextLast = n % 10;
   if (lastDigit > nextLast) cout << "Upward\n";
   else cout << "Not upward\n";
   return 0;
}
```

Problem 4 Consider the following C++ program.

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

int main() {
    int x = 2345;
    cout << x % 10 << endl;                  // line (a)
    cout << x / 10 << endl;                  // line (b)
    if (x > 5000) cout << "Big" << endl;     // line (c)
    cout << endl;
    while (x > 0) { cout << "*";  x /= 10;}  // line (d)
    cout << endl;
    cout << x + 5 << endl;                   // line (e)
}
```

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

Answer:

```
5
```

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

Answer:

```
234
```

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

Answer:

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

Answer:

```
****
```

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

Answer:

```
5
```

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CSCI 111 Midterm 1, version E Exam Fall 2014 10.14.14

Solutions

11.00am – 11.50am, Tuesday, October 14, 2014

Problem 1 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 9.

2. It repeatedly reads n from the user until the supplied value of n is legal.

3. It prints out a picture of a triangle with n rows, in which the symbol used to print each row is the row's number.

Here is an example of how the program should work:

```
Give me an integer between 1 and 9:   5
1
22
333
4444
55555
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 9:";
   cin >> n;

   while (n < 1 || n > 9) {
      cout << "Illegal.  Try again: ";
      cin >> n;
   }

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= r; c++) cout << r;
      cout << endl;
   }
   return 0;
}
```

Problem 2 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter a positive integer n.

2. It terminates when given illegal input.

3. It prints out the product of the digits of n.

Here is an example of how the program should work:

```
Give me a positive integer:  41311

12
```

Answer:

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

```
int main() {
   int n;
   cout << "Give me a positive integer:";
   cin >> n;

   if (n <= 0) return 0;
   int product = 1;
   while (n > 0) {
      product = product * (n % 10);
      n = n / 10;
   }
   cout << product << endl;
   return 0;
}
```

Problem 3 Consider the following C++ program.

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

int main() {
    int y,x = 13;
    cout << x + x * 10 << endl;                // line (a)
    cout << x / 100 << endl;                   // line (b)
    for (y = 10; y < x; y++) cout << y;        // line (c)
    cout << endl;
    if (x > 50) cout << x; else cout << 2 * x; // line (d)
    cout << endl;
    cout << x << "*" << x << endl;             // line (e)
}
```

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

Answer:

```
143
```

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

Answer:

```
0
```

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

Answer:

```
101112
```

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

Answer:

```
26
```

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

Answer:

```
13*13
```

Problem 4

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized, and x is positive

```
int x, y;
```

(a) Print the exact value the quotient of y by x, as a decimal

Answer:

```
cout << (1.0 * y) / x << endl;
```

(b) Exit the program if y is positive

Answer:

```
if (y > 0) return 0;
```

(c) Print -y copies of the the string `"y >= 0; "`

Answer:

```
for (int c = 1; c <= -y; c++) cout << "y >= 0" <<  endl;
```

(d) Replace y by the absolute value of x - y.

Answer:

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

(e) Print the first digit of y followed by the last digit of x

Answer:

```
while (y > 10) {
   y = y / 10;
}
cout << y << x % 10 << endl;
```

QUEENS COLLEGE Department of Computer Science
CSCI 111 Midterm 1, version F Exam Fall 2014 10.14.14

Solutions

11.00am – 11.50am, Tuesday, October 14, 2014

Problem 1 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 9.

2. It exits immediately if n is illegal.

3. It prints out a picture of a triangle with n rows, in which the symbol used to print each column is the column's number.

Here is an example of how the program should work:

```
Give me an integer between 1 and 9:   5
1
12
123
1234
12345
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 9:";
   cin >> n;

   if (n < 1 || n > 9) return 0;

   for (int r = 1; r <= n; r++) {
      for (int c = 1; c <= r; c++) cout << c;
      cout << endl;
   }
   return 0;
}
```

Problem 2 Consider the following C++ program.

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

int main() {
    int y,x = 211;
    cout << x + x * 10 << endl;                // line (a)
    cout << x / 100 << endl;                   // line (b)
    for (y = 210; y < x; y++) cout << y;       // line (c)
    cout << endl;
    if (x > 50) cout << x; else cout << 2 * x; // line (d)
    cout << endl;
    cout << x << "*" << x << endl;             // line (e)
}
```

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

Answer:

```
2321
```

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

```
2
```

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

```
210
```

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

```
211
```

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

```
211*211
```

Problem 3 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 99.
2. It terminates when given illegal input.
3. It prints out the first 3 digits of n (in order, on one line).

Here is an example of how the program should work:

```
Give me an integer greater than 99:  95424

954
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 99:";
   cin >> n;

   if (n < 100) return 0;
   while (n > 999) n = n / 10;
   cout << n << endl;
   return 0;
}
```

Problem 4

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized, and x is positive

```
   int x, y;
```

(a) Print x copies of the last digit of x on a single line of output.

Answer:

```
for (int c = 1; c <= x; c++) cout << x % 10;
cout << endl;
```

(b) Print the exact value the quotient of x by y, as a decimal

Answer:

```
cout << (1.0 * x) / y << endl;
```

(c) Exit the program if y is negative

Answer:

```
if (y < 0) return 0;
```

(d) Replace y by its absolute value.

Answer:

```
if (y < 0) y = -y;
```

(e) Print the first digit of x

Answer:

```
while (x > 10) {
   x = x / 10;
}
cout << x << endl;
```

QUEENS COLLEGE Department of Computer Science
CSCI 111 Midterm 1, version G Exam Fall 2014 10.14.14

Solutions

11.00am – 11.50am, Tuesday, October 14, 2014

Problem 1 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 9.

2. It repeatedly reads n from the user until the supplied value of n is legal.

3. It prints out a picture of an upside down triangle with n rows, in which the symbol used to print each row is the row's number.

Here is an example of how the program should work:

```
Give me an integer between 1 and 9:   5
11111
2222
333
44
5
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 9:";
   cin >> n;

   while (n < 1 || n > 9) {
      cout << "Illegal.  Try again: ";
      cin >> n;
   }

   for (int r = n; r >= 1; r--) {
      for (int c = 1; c <= r; c++) cout << n + 1 - r;
      cout << endl;
   }
   return 0;
}
```

Problem 2 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter a positive integer n.

2. It terminates when given illegal input.

3. It prints out the sum of those digits of n that are even numbers.

Here is an example of how the program should work:

```
Give me a positive integer:  41815

12
```

Answer:

```
#include <iostream>
```

```
using namespace std;

int main() {
   int n;
   cout << "Give me a positive integer:";
   cin >> n;

   if (n <= 0) return 0;
   int sum = 0;
   while (n > 0) {
      int digit = n % 10;
      if (digit % 2 == 0) sum = sum + digit;
      n = n / 10;
   }
   cout << sum << endl;
   return 0;
}
```

Problem 3 Consider the following C++ program.

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

int main() {
    int y,x = 12;
    cout << x + x * 10 << endl;                // line (a)
    cout << x / 100 << endl;                   // line (b)
    for (y = 10; y < x; y++) cout << y;        // line (c)
    cout << endl;
    if (x > 50) cout << x; else cout << 2 * x; // line (d)
    cout << endl;
    cout << x << "*" << x << endl;             // line (e)
}
```

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

Answer:

```
132
```

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

Answer:

```
0
```

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

Answer:

```
1011
```

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

Answer:

```
24
```

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

Answer:

```
12*12
```

Problem 4

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized, and x is positive

```
int x, y;
```

(a) Exit the program if y is positive

Answer:

```
if (y > 0) return 0;
```

(b) Print -y copies of the the string `"y >= 0; "`

Answer:

```
for (int c = 1; c <= -y; c++) cout << "y >= 0" <<  endl;
```

(c) Print the exact value the quotient of y by x, as a decimal

Answer:

```
cout << (1.0 * y) / x << endl;
```

(d) Replace y by the absolute value of x + y.

Answer:

```
y = x + y;
if (y < 0) y = -y;
```

(e) Print the first digit of y

Answer:

```
while (y > 10) {
   y = y / 10;
}
cout << y << endl;
```

QUEENS COLLEGE Department of Computer Science
CSCI 111 Midterm 1, version H Exam Fall 2014 10.14.14

Solutions

11.00am – 11.50am, Tuesday, October 14, 2014

Problem 1 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is between 1 and 9.

2. It exits immediately if n is illegal.

3. It prints out a picture of an upside down triangle with n rows, in which the symbol used to print each column is the column's number.

Here is an example of how the program should work:

```
Give me an integer between 1 and 9:   5
12345
1234
123
12
1
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer between 1 and 9:";
   cin >> n;

   if (n < 1 || n > 9) return 0;

   for (int r = n; r >= 1; r--) {
      for (int c = 1; c <= r; c++) cout << c;
      cout << endl;
   }
   return 0;
}
```

Problem 2 Consider the following C++ program.

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

int main() {
    int y,x = 210;
    cout << x + x * 10 << endl;                // line (a)
    cout << x / 100 << endl;                   // line (b)
    for (y = 210; y < x; y++) cout << y;       // line (c)
    cout << endl;
    if (x > 50) cout << x; else cout << 2 * x; // line (d)
    cout << endl;
    cout << x << "*" << x << endl;             // line (e)
}
```

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

Answer:

```
2310
```

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

```
2
```

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

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

```
210
```

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

```
210*210
```

Problem 3 Write a complete C++ program that does the following. (Programs that correctly carry out some of the tasks will receive partial credit.)

1. It asks the user to enter an integer n that is greater than 9.
2. It terminates when given illegal input.
3. It prints out the first 2 digits of n (in order, on one line).

Here is an example of how the program should work:

```
Give me an integer greater than 9:  95424

95
```

Answer:

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

int main() {
   int n;
   cout << "Give me an integer greater than 9:";
   cin >> n;

   if (n < 10) return 0;
   while (n > 99) n = n / 10;
   cout << n << endl;
   return 0;
}
```

Problem 4

Write C++ statements to carry out the following tasks. Do not write complete programs, just give a few lines of C++ code. Assume the following variables have been declared and initialized, and x is positive

```
   int x, y;
```

(a) Exit the program if y is negative

Answer:

```
if (y < 0) return 0;
```

(b) Print x copies of the last digit of y on a single line of output.

Answer:

```
for (int c = 1; c <= x; c++) cout << y % 10;
cout << endl;
```

(c) Print the exact value the quotient of x by y, as a decimal

Answer:

```
cout << (1.0 * x) / y << endl;
```

(d) Replace y by its absolute value.

Answer:

```
if (y < 0) y = -y;
```

(e) Print the first digit of x followed by the last digit of y

Answer:

```
while (x > 10) {
   x = x / 10;
}
cout << x << y% 10 << endl;
```