Homework 2: Quiz 2 Preparation

Due: October 19 (in-class)

Problem 1. Constants

For each constant below, specify its type. If the constant is invalid, say "invalid".

(a) -357  
(b) 929,567  
(c) -2.001  

(d) 'c'  
(e) 800e-3  
(f) 4.2.2  

(g) 0  
(h) 'Alex'  
(i) true  

(j) 23,01.14  
(k) 5.2e12  
(l) '\n'  

(m) 3.4e3  
(n) "a"  
(o) 4.2e2.4  

Problem 2. Assignment

Consider the following code fragment:

\[
\begin{align*}
x &= x + -y/3 + z\%7; \\
y &= x + y; \\
z &= z + y;
\end{align*}
\]

All variables are declared as \texttt{int}s above the fragment. For each set of initial (i.e., before the code fragment is executed) variable assignments below, specify the values of \(x\), \(y\) and \(z\) after the code fragment executes.

(a) Initial: \(x: 5\) \(y: 2\) \(z: 2\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)

(b) Initial: \(x: 50\) \(y: 50\) \(z: 22\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)

(b) Initial: \(x: -10\) \(y: -8\) \(z: 99\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)

Problem 3. Assignment

Consider the following code fragment:

\[
\begin{align*}
x &= x + y - ++z; \\
y &= z - x++; \\
z &= z * z;
\end{align*}
\]

All variables are declared as \texttt{int}s above the fragment. For each set of initial (i.e., before the code fragment is executed) variable assignments below, specify the values of \(x\), \(y\) and \(z\) after the code fragment executes.

(a) Initial: \(x: 1\) \(y: 1\) \(z: 1\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)

(b) Initial: \(x: 20\) \(y: 5\) \(z: 2\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)

(c) Initial: \(x: -4\) \(y: -5\) \(z: 10\)

Final: \(x: ___\) \(y: ___\) \(z: ___\)
Problem 4. Comparisons and logical expressions

Consider the following assignments (all variables are int and declared):

\[
\begin{align*}
  x &= 2; \\
  y &= 3; \\
  z &= x++ - y++; \\
  y &= z;
\end{align*}
\]

For each expression below, specify what it evaluates to.

(a) \( x == -2 \) evaluates to _________
(b) \( x == y \) evaluates to _________
(c) \( y <= z \) evaluates to _________
(d) \( !(z+x >= y) \) evaluates to _________
(e) \( y > 0 || x < 0 \) evaluates to _________
(f) \( (z && x && y) \) evaluates to _________
(g) \( ! (++y) \) evaluates to _________
(h) \( x && (x!=z || z != y) & ! (y||z) \) evaluates to _________
(i) \( (z+z > x*y) \) evaluates to _________
(j) \( (z && x && ! y) \) evaluates to _________
(k) \( (0 == 0 - (x-y-z)) \) evaluates to _________
Problem 5. Comparisons and logical expressions

Consider the following assignments (all variables are int and declared):

\[ x = 2; \]
\[ y = x*2; \]
\[ z = x*y; \]

For each expression below, specify what it evaluates to.

(a) \(x \geq y \% x\) evaluates to _________

(b) \(y \geq x \& \& y \leq z\) evaluates to _________

(c) \(! (y+x \geq z/2)\) evaluates to _________

(d) \(! (y-x == z/y) \| \| (y > x)\) evaluates to _________

(e) \((x*x*x == z) \& \& !(y == x)\) evaluates to _________

(f) \((z-x <= y + z) \| \| !(z-x <= y+z)\) evaluates to _________

(g) \(! (x>z) \& \& !(z<y) \& \& !(y<x)\) evaluates to _________

(h) \((z+z > x*x*y) \| \| !(x==y)\) evaluates to _________

(i) \((x - x) \& \& (y*y*y*y*y >= x*z*x*z)\) evaluates to _________

(j) \((z*x - z) \| \| (y - x*2)\) evaluates to _________
Problem 5. Conditionals

In the code fragments below all variables are declared as int.

(1) Consider the following code fragment:

```c
z = 0;
if (x >= y) {
    if (x <= y+10) {
        z = 1;
    }
} else {
    if (y < 100 && x*y % 2 == 0) {
        z = 5;
    } else {
        z++;
        ++z;
    }
}
```

Compute the value of z after this code is executed, for each pair of values of x and y provided below:

(a) x = 6; y = 6; z is _____________
(b) x= 99; y = 11; z is _____________
(c) y = 300; x = 400; z is _____________

(1) Consider the following code fragment:

```c
switch(x+y%z) {
    case 1: {break;}
    case 2: {x = 5;}
    case 3: {y = 5;}
    case 4: {x = y-1; break;}
    case 5: {y = x+1;}
    default:{x = 0;}
}
```

Compute the values of x and y after this code is executed, for each pair of initial values of x and y and z provided below:

(a) x = 5; y = 8; z=10; x is ______ y is ______
(b) x= 5; y = 7; z=8; x is ______ y is ______
(c) x = 2; y = 17; z= 9; x is ______ y is ______
(d) x= 7; y = 5; z=8; x is ______ y is ______
(e) x = 10; y = 4; z= 13; x is ______ y is ______