

Solutions to Quick Check Questions

3

Numerical Data

3.1 Variables



Quick Check

1. Why are the following declarations all invalid?

```
1 —> int      a, b, a;  
2 —> float    x, int;  
3 —> float    w, int x;  
4 —> bigNumber double;
```

1. The variable **a** is declared twice.
2. Reserved word **int** cannot be used as an identifier.
3. Need a semicolon after **w** instead of a comma or remove the reserved word **int**.
4. The order of data type and identifier is reversed.

2. Assuming the following declarations are executed in sequence, why are the second and third declarations invalid?

```
int      a, b;
int      a;
float    b;
```

Because you are not allowed to declared the same identifier more than once.

3. Name six data types for numerical values.

byte, short, int, long, float, double

4. Which of the following are valid assignment statements (assuming the variables are properly declared)?

Valid → x = 12;
12 = x;

y + y = x;

Valid → y = x + 12;

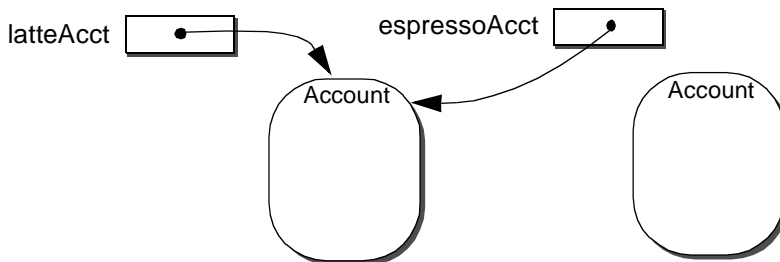
5. Draw the state-of-memory diagram for the following code:

```
Account latteAcct, espressoAcct;
```

```
latteAcct = new Account();
```

```
espressoAcct = new Account();
```

```
latteAcct = espressoAcct;
```





3.2 Arithmetic Expressions

Quick Check

1. Evaluate the following expressions:

- a. $3 + 5 / 7$
- b. $3 * 3 + 3 \% 2$
- c. $3 + 2 / 5 + -2 * 4$
- d. $2 * (1 + -(3/4) / 2) * (2 - 6 \% 3)$

a. 3

b. 10

c. -5

d. 4

2. What is the data type of the result of the following expressions?

- a. $(3 + 5) / 7$
- b. $(3 + 5) / (\text{float}) 7$
- c. $(\text{float}) ((3 + 5) / 7)$

a. *int*

b. *float*

c. *float*

3. Which of the following expressions is equivalent to $\frac{-b(c+34)}{2a}$?

- this \longrightarrow
- a. $-b * (c + 34) / 2 * a$
 - b. $-b * (c + 34) / (2 * a)$
 - c. $-b * c + 34 / (2 * a)$

b

3.3 Constants

No Quick Check Questions.

3.4 The Math Class

1. What's wrong with the following?

a. `y = (1/2) * Math.sqrt(X) ;`

b. `y = sqrt(38.0);`

c. `y = Math.exp(2, 3);`

d. `y = math.sqrt(b*b - 4*a*c) / (2 * a);`

a. (1/2) is always 0.

b. Should be `Math.sqrt`

c. No such `Math` method

d. The class name is `Math`, not `math`.

2. If another programmer writes the following statements, do you suspect any misunderstanding on the part of this programmer? What will be the value of `y`?

a. `y = Math.sin(360) ;`

b. `y = Math.cos(45) ;`

Yes, most likely this programmer is thinking that he is passing the angles in degrees to the `sin` and `cos` methods. The methods accept the angle in radians.

3.5 InputBox



Quick Check

1. What is wrong with the following?

```
final double x = 123.444;
x = inputBox.getDouble( );
```

The identifier `x` is declared constant, so it is invalid to assign a value returned by an `InputBox` object.

2. Which of the following code is valid?

Valid → a. `double number;`
 `number = inputBox.getFloat();`

Invalid → b. `float number;`
 `number = inputBox.getDouble();`

The second one is invalid because you cannot assign a double value to a float variable.



3.6 OutputBox

Quick Check

1. What's wrong with the following?

```
a. int age = 10;
   outputBox.show( age );

b. int age = 20;
   outputBox.print( "Your age is age" );
```

a. The `OutputBox` class does not have a method called `show`.

b. The output will be the string `Your age is age`. Should be

```
outputBox.print( "Your age is " + age );
```

2. Will the following code work?

```
age = 20;
messageBox.show( "Your age is " + age );
```

Yes

3. Write a code (not a full program) to input the year of birth and output

You are born in 1980.
In the year 2120, you will be 140 years old.

Here's one way to do it:

```
int age, birthYear;  
birthYear = inputBox.getInteger("Your real age: ");  
age = 2120 - birthDate;  
outputBox.println( "Your are born in" + birthYear );  
outputBox.println( "In year 2120, you will be "  
                    + age + " years old.");
```

3.7 Sample Program: Loan Calculator

No Quick Check Questions.

3.8 Numerical Representation (Optional)

No Quick Check Questions.