

## DATA TYPES

1. State whether the following are legal identifiers in Java. If they are not legal, indicate why.
  - a. number
  - b. 5number
  - c. thisNumber
  - d. that\_number
  - e. big number
  - f. char
  - g. character
  
2. State whether the following are legal declarations and initializations of identifiers. If they are not legal, indicate how to correct them.
  - a. **int** num1 = 8;
  - b. **int** num2 = 7.6;
  - c. **float** num3 = 5;
  - d. **float** num4 = 5.9;
  - e. **float** num5 = 4.34e5;
  - f. **char** ch1 = 'v';
  - g. **char** ch2 = 84;
  - h. **double** num6 = 78456;
  - i. **double** num7 = 23,567;
  - j. **double** num8 = \$123.68;
  - k. **long** num9 = 28;
  
3. Use the ASCII chart on page H.A.3.2 find the output of the following code:

```
char letter1 = 'J';
char letter2 = 'a';
char letter3 = 'v';
char letter4 = 'a';
```

```
System.out.print("The letters of the word ");
System.out.print(letter1);
System.out.print(letter2);
System.out.print(letter3);
System.out.println(letter4);
System.out.print("have ASCII positions ");
```

```
System.out.print((int)letter1 + ", ");
System.out.print((int)letter2 + ", ");
System.out.print((int)letter3 + " and ");
System.out.println((int)letter4);
```

4. Determine the exact output to the following code segment:

```
int sum1 = 10+5;
double sum2 = 10+5.0;
int quotient1 = 15/4;
double quotient2 = 15/4;
double quotient3 = 15/4.0;
int remainder1 = 15 % 4;
double remainder2 = 17.84 % 2.3;

System.out.println("10+5 is " + sum1);
System.out.println("10+5.0 is " + sum2);
System.out.println("15/4 is " + quotient1);
System.out.println("15/4 is " + quotient2);
System.out.println("15/4.0 is " + quotient3);
System.out.println("15 % 4 is " + remainder1);
System.out.println("17.84 % 2.3 is " + remainder2);
```

### Investigation and Challenge

5. As discussed in this lesson, integers are stored as binary values. The base 10 numbers 27 and 21 (using short ints) are stored as 000000000011011 and 0000000000010101 respectively. Add these two binary numbers together and convert the sum back to base 10. Did you get 48?