

1. (Save as Display.java)

(Integer Value of a Character) You learned about integers and the type `int`. Java can also represent uppercase letters, lowercase letters and a considerable variety of special symbols. Every character has a corresponding integer representation. The set of characters a computer uses together with the corresponding integer representations for those characters is called that computer's character set. You can indicate a character value in a program simply by enclosing that character in single quotes, as in `'A'`.

You can determine a character's integer equivalent by preceding that character with `(int)`, as in

```
(int) 'A'
```

An operator of this form is called a cast operator.

The following statement outputs a character and its integer equivalent:

```
System.out.printf("The character %c has the value %d\n", 'A', (int) 'A');
```

When the preceding statement executes, it displays the character `A` and the value `65` (from the Unicode® character set) as part of the string. The format specifier `%c` is a placeholder for a character (in this case, the character `'A'`).

Using statements similar to the one shown earlier in this exercise, write an application that displays the integer equivalents of some uppercase letters, lowercase letters, digits and special symbols. Display the integer equivalents of the following: `A B C a b c 0 1 2 $ * + /` and the blank character.

Sample out:

```
The character A has the value 65
The character B has the value 66
The character C has the value 67
The character a has the value 97
The character b has the value 98
The character c has the value 99
The character 0 has the value 48
The character 1 has the value 49
The character 2 has the value 50
The character $ has the value 36
The character * has the value 42
The character + has the value 43
The character / has the value 47
The character   has the value 32
```

2. (Save as Calculations.java)

(Number Calculations) Write an application that inputs three integers from the user and displays the sum, average, product, smallest and largest of the numbers. [Note: The calculation of the average in this exercise should result in real number representation (2 decimal points) of the average. So if the sum of the values is 7, the average should be 2.33]

Sample output:

```
Enter first integer: 10
Enter second integer: 20
Enter third integer: 30

For the numbers 10, 20 and 30
Largest is 30
Smallest is 10
Sum is 60
Product is 6000
Average is 20
```

3. (Save as Numbers.java)

(Table of Squares and Cubes) Using only the programming techniques you learned, write an application that calculates the squares and cubes of the numbers from 0 to 10 and prints the resulting values in table format, as shown below. [Note: This program does not require any input from the user.]

Sample output:

number	square	cube
0	0	0
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000

4. (Save as Five.java)

(Separating the Digits in an Integer) Write an application that inputs one number consisting of five digits from the user, separates the number into its individual digits and prints the digits separated from one another by three spaces each. For example, if the user types in the number 12345, the program should print

1 2 3 4 5

Assume that the user enters the correct number of digits. What happens when you execute the program and type a number with more than five digits? What happens when you execute the program and type a number with fewer than five digits?

Sample output:

```
Enter five-digit integer: 12345
Digits in 12345 are 1   2   3   4   5
Enter five-digit integer: 123456
Digits in 123456 are 12   3   4   5   6
Enter five-digit integer: 123
Digits in 123 are 0   0   1   2   3
```