

Lesson 10.....The *switch* Statement and *char*

The *if* statement is the most powerful and often used decision-type command. The *switch* statement is useful when we have an integer variable that can be one of several quantities. For example, consider the following menu scenario (enter and run this program):

```
//This code should be placed inside the main method of a class
System.out.println("Make your arithmetic selection from the choices below:\n");

System.out.println("  1. Addition");
System.out.println("  2. Subtraction");
System.out.println("  3. Multiplication");
System.out.println("  4. Division\n");

System.out.print("      Your choice? ");

Scanner kbReader = new Scanner(System.in);
int choice = kbReader.nextInt();

System.out.print("\nEnter first operand. ");
double op1 = kbReader.nextDouble();
System.out.print("\nEnter second operand. ");
double op2 = kbReader.nextDouble();

System.out.println("");

switch (choice)
{
    case 1: //addition
        System.out.println(op1 + " plus " + op2 + " = " + (op1 + op2) );
        break;
    case 2: //subtraction
        System.out.println(op1 + " minus " + op2 + " = " + (op1 - op2) );
        break;
    case 3: //multiplication
        System.out.println(op1 + " times " + op2 + " = " + (op1 * op2) );
        break;
    case 4: //division
        System.out.println(op1 + " divided by " + op2 + " = " + (op1 / op2) );
        break;
    default:
        System.out.println("Hey dummy, enter only a 1, 2, 3, or 4!");
}
}
```

The optional *default*:

The *default* command is optional. You can use it if there might be a possibility of the value of *choice* not being one of the cases.

Give me a *break*:

The *break* statements are normally used. Try leaving them out and see what happens here. In the next section we will look at an application in which they are omitted.

Basically, *break* jumps us out of the *switch* structure and then code execution continues with the first line immediately after the closing *switch* brace. Specifically, you might want to omit the *break* within the *case 1:* section. If *choice* is 1 then the result will be that it prints the answer for **both** addition and subtraction.

The next experiment you might want to do is to leave the parenthesis off of $(op1 + op2)$ in the *case 1:* section. Since $op1 + op2$ is no longer in parenthesis, the plus between them no longer means addition. It now means concatenation since all the activity to the left of this point in the code was also *String* concatenation.

Leaving off the *break*:

Now, let's look at an example where we intentionally omit *break*:

```
//Suppose at this point in the program we have an integer variable, j. If j equals 1,
//2, or 3 we want to set String variable s to "low" and if j equals 4, 5, or 6 we want
//to set s to "high". If j equals 7, set s to "lucky".
switch ( j )
{
    case 1:
    case 2:
    case 3:
        s = "low";
        break;
    case 4:
    case 5:
    case 6:
        s = "high";
        break;
    case 7:
        s = "lucky";
}
```

A new data type... *char*:

Before we look further at the *switch* statement, we must look at a new data type, *char*. This stands for character. Following is a typical way to declare and initialize a character:

```
char ch = 'h';
```

Notice that a character is always enclosed in single quotes. Characters can be anything, even numbers or symbols:

```
char x = '6';          char pp = '@';
```

int and *char* are permissible types:

switch() statements primarily switch on **integers** or **characters** (*short* and *byte* types can also be used, but rarely are). Modify the example on the previous page to switch on a *char* instead of *int*. See the next page for the necessary modifications:

```

System.out.println("Make your arithmetic selection from the choices below:\n");

System.out.println("  A. Addition");
System.out.println("  S. Subtraction");
System.out.println("  M. Multiplication");
System.out.println("  D. Division\n");

System.out.print("    Your choice? ");

Scanner kbReader = new Scanner(System.in);
String choice = kbReader.nextLine();
//char ch = choice; //You would think this would work...but it doesn't.
char ch = choice.charAt(0); //you just learned another String method.

System.out.print("\nEnter first operand. ");
double op1 = kbReader.nextDouble();
System.out.print("\nEnter second operand. ");
double op2 = kbReader.nextDouble();

System.out.println("");

switch (ch)
{
    case 'A': //addition
    case 'a': //Notice we are providing for both capital A and little a.
        System.out.println(op1 + " plus " + op2 + " = " + (op1 + op2) );
        break;
    case 'S': //subtraction
    case 's':
        System.out.println(op1 + " minus " + op2 + " = " + (op1 - op2) );
        break;
    case 'M': //multiplication
    case 'm':
        System.out.println(op1 + " times " + op2 + " = " + (op1 * op2) );
        break;
    case 'D': //division
    case 'd':
        System.out.println(op1 + " divided by " + op2 + " = " + (op1 / op2) );
        break;
    default:
        System.out.println("Hey dummy, enter only a A, S, M, or D!");
}

```

Exercise on Lesson 10

1. What are two permissible data types to use for *x* in the following?

```
switch (x){ ... }
```

2. What is the output of the following code?

```
int x = 3, p = 5, y = -8;
switch(x)
{
    case 2:
        p++;
    case 3:
    case 4:
        y+=(-p);
        break;
    case 5:
        y+=(p++);
}
System.out.println(y);
```

3. Write a *switch* structure that uses the character *myChar*. It should increment the integer variable *y* if *myChar* is either a capital or small letter G. It should decrement *y* if *myChar* is either a capital or a small letter M. If *myChar* is anything else, add 100 to *y*.

4. What is output by the following code?

```
int z = 2, q = 0;
switch(z)
{
    case 1:
        q++;
    case 2:
        q++;
    case 3:
        q++;
    case 4:
        q++;
    default:
        q++;
}
System.out.println(--q);
```

5. Write a line of code that declares the variable *chr* as a character type and assigns the letter *z* to it.

6. What is output by the following?

```
int x = 10, y = 12;
System.out.println( "The sum is " + x + y );
System.out.println( "The sum is " + (x + y) );
```

7. Convert the following code into a *switch* statement.

```
if(speed == 75)
```

```

    {
        System.out.println("Exceeding speed limit");
    }
else if( (speed == 69) || (speed == 70) )
    {
        System.out.println("Getting close");

    }
else if(speed == 65)
    {
        System.out.println("Cruising");
    }
else
    {
        System.out.println("Very slow");
    }
}

```

8. Is *default* a mandatory part of a *switch* structure?
9. Write a line of code that converts *String s = "X"* into a character called *chr*.

Project...Weight on Other Planets

Write a program that will determine the user's weight on another planet. The program should ask the user to enter his weight (on earth) via the keyboard and then present a menu of the other mythical planets. The user should choose one of the planets from the menu, and use a *switch* (with an integer) statement to calculate the weight on the chosen planet. Use the following conversion factors to determine the user's weight on the chosen planet.

| Planet | Multiply weight by |
|-----------|--------------------|
| Voltar | 0.091 |
| Krypton | 0.720 |
| Fertos | 0.865 |
| Servontos | 4.612 |

A typical output screen will be similar to the following:

```
What is your weight on the Earth? 135
```

1. Voltar
2. Krypton
3. Fertos
4. Servontos

```
Selection? 1
```

```
Your weight on Voltor would be 12.285
```