

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
```