

1.00/1.001 Tutorial 2

Control, Objects & Classes

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Topics

- Control Structures
- Objects and Classes
- Problem Set 2

Control Structures: Branch (Review)

```
if (boolean) {  
    statement;  
}
```

```
if (boolean) {  
    statement1;  
}  
else {  
    statement2;  
}
```

Control Structures: Branch (Review)

```
if (boolean1) {  
    statement1; }  
else if (boolean2) {  
    statement2; }  
...  
else if (booleanN) {  
    statementN; }  
else {statement; }
```

Control Structures – Branch Example

```
//A simple (and somewhat silly) example

int x = Integer
    .parseInt(JOptionPane
        .showInputDialog("Enter any integer."))
if(x<0)
    System.out.println("Integer less than 0");
else if(x>0)
    System.out.println("Integer greater than 0");
else
    System.out.println("Integer equals 0");
```

Control Structures: Iteration (1)

```
while (boolean) {  
    statement;  
}
```

```
/*Executes statement until  
boolean is false. If boolean  
is initially false, loop  
never executes.*/
```

Control Structures - Exercise 1

Use a `while` loop to add numbers from 1 to 10 and print the result.

Control Structures: Iteration (2)

```
do {  
    statement;  
} while (boolean);
```

```
/*Executes statement until  
boolean is false. If boolean  
is initially false, loop will  
execute once.*/
```

Control Structures - Exercise 2

Repeat Exercise 1, using a `do...while` loop.

Control Structures: Iteration (3)

```
for(start_expr; end_bool; cont_expr)
{
    statement;    }
```

```
/*Starting at start_expr, statement
& cont_expr are executed until
end_bool is false. If end_bool is
initially false, loop never
executes.*/
```

Control Structures - Exercise 3

Repeat Exercise 1, using a `for` loop.

Control Structures - Exercise 4

- Upgrade your solution to Exercise 1, so your program now prints whether the result is even or odd number. (Hint: use branching.)

Classes and Objects

We've already met some classes and objects:

- Class: JOptionPane, String
- Object: "What is your name?" (String object)

What are classes and objects?

- Classes are patterns
 - blueprints & specifications
- Objects are instances of classes
 - A skyscraper (built using blueprints and specifications)

Classes and Objects cont'd

What does a class definition usually contain?

- Constructor to create an instance of class
 - The process of building a skyscraper
- Data member to hold information about an object
 - A skyscraper has a height, a mass, a certain number of windows
- Method to invoke behavior on object
 - A skyscraper sways

Anatomy of Class

```
public class ClassName {  
  
    Data Members  
  
    Constructor  
  
    Methods  
  
}
```

Example of Class

```
public class Student {  
    //data members  
    private int ID;  
    public String name;  
  
    //constructor  
    public Student (int i,String s ) {  
        ID = i;  
        name = s;}  
  
    //methods  
    public int yourID() {return ID;}  
}
```

Create and Use Instance (Object)

- Keyword `new`

```
Student dave = new  
    Student (12, "Dave");
```

- `.` operator

```
int id = dave.yourID();  
System.out.println(dave.name+"\t"  
    +id);
```

Exercise 4

- Let's design our tutorial section
 - Determine the types of objects
 - Identify data members for each object
 - Identify methods for each object

Problem Set 2

- Theme: Banking & Investment
 - Creating classes and data members
 - Looping
- Calculating interest
- `Math.random()`

Problem Set 2 cont'd

- Interest Calculation

Balance at beginning of period = \$1000

Interest rate for period = 3%

Interest = $\$1000 \times 3\% = \30

Balance at end of period = $\$1000 + \$30 = \$1030$

OR

Balance at end of period = $(100\% + 3\%) \times \$1000 = \1030

Interest = $\$1030 - \$1000 = \$30$

Problem Set 2 cont'd

- `Math.random()`
 - Takes no arguments
 - Returns a `double` between 0 and 1

`4+6*Math.random()` gives a number in what range?

How would you generate a random number between 50 and 100?

Exercise 5

Exercise:

- Initial investment = \$2,500
- Interest rate fluctuates between 3 and 5% in any period
- What is the final value of the investment and interest accrued at the end of 10 periods?