

## Recitation: Branch

### Jun 30, 2008

#### 1. Nested if-else Statements

- What is the output of the following program (only use pen and paper)
- Test this program in your computer
- Modify the program by deleting else in the statement "else if (hasWings)". What is the output?
- Change the values of hasFourLegs, playsFetch and hasWings.  
hasFourLegs = false;  
playsFetch = true;  
hasWings = true;  
What is the output?

```
public class Animals
{
    public static void main(String [] args)
    {
        boolean hasFourLegs, playsFetch, hasWings;

        hasFourLegs = true;
        playsFetch = false;
        hasWings = false;

        if (hasFourLegs)
        {
            if (playsFetch)
            {
                System.out.println ("DOG");
            }
            else
            {
                System.out.println ("CAT");
            }
        }
        else if (hasWings)
        {
            System.out.println ("BIRD");
        }
        else
        {
            System.out.println ("FISH");
        }
    }
}
```

Solution

A. CAT

C. CAT  
FISH

D. BIRD

2. Write a program that prompts the user to input two numbers. The program should then output the larger number.

<http://www.cs.unc.edu/~zlj/comp110/Program/MaxValue.java>

### 3. Cable Company Billing

We need to write a program that calculates a customer's bill for a local cable company. There are two types of customers: residential and business. There are two rates for calculating a cable bill: one for residential customers and one for business customers.

For residential customers, the following rates apply:

- Bill-processing fee: \$4.50
- Basic services fee: \$20.50
- Premium channels: \$7.50 per channel

For business customers, the following rates apply:

- Bill-processing fee: \$15.00
- Basic services fee: \$75.00 for the first 10 connections; \$5.00 for each additional connection
- Premium channels: \$50.00 per channel for any number of connection

The program should ask the user for an account number (an integer) and a customer code. Assume that R or r stands for a residential customer, and B or b stands for a business customer. The program should also ask the user for the number of premium channels to which the customer subscribes and, in the case of business customers, the number of basic service connections.

#### Problem analysis

What are the input and output of this problem?

Input	<ol style="list-style-type: none"> <li>1. Account number (integer)</li> <li>2. Customer code (char)</li> <li>3. Number of channels (integer)</li> <li>4. If it is a business customer, the number of connections</li> </ol>
Output	<ol style="list-style-type: none"> <li>1. Account number</li> <li>2. Customer code</li> <li>3. The amount of bill (double)</li> </ol>

## Variables

What variables does the program need?

Variable Name	Data Type	Usage
int accountNum;		
char customerCode;		
int channelNum;		
int connectionNum;		
double cost;		
final double RES_BILL_PROC_FEE = 4.50 ;		
final double RES_BASIC_SERVICE_FEE = 20.50;		
final double RES_PRE_PER_CHANNEL = 7.50;		
final double BUS_BILL_PROC_FEE = 15.00;		
final double BUS_BASIC_SERVICE_FEE = 75.00;		
final double BUS_ADD_SERVICE_FEE = 5.00;		
final double BUS_PRE_PER_CHANNEL = 50.00;		

## What are the formulas to calculate the bill?

Residential customer

```
cost = RES_BILL_PROC_FEE;
cost = cost + RES_BASIC_SERVICE_FEE;
cost = cost + RES_PRE_PER_CHANNEL * channelNum;
```

Business customer

```
cost = BUS_BILL_PROC_FEE;
if(connectionNum <= 10)
    cost = cost + BUS_BASIC_SERVICE_FEE;
else
    cost = cost + BUS_ADD_SERVICE_FEE*( connectionNum-10);
```

## Which type of selection statement should be used?

```
if(customerCode == 'R' || customerCode == 'r')
{
    // It is a residential customer
    // cost = RES_BILL_PROC_FEE;
    // cost = cost + RES_BASIC_SERVICE_FEE;
    // cost = cost + RES_PRE_PER_CHANNEL * channelNum;

}
else if (customerCode == 'B' || customerCode == 'b')
{
    /* cost = BUS_BILL_PROC_FEE;
    if(connectionNum <= 10)
        cost = cost + BUS_BASIC_SERVICE_FEE;
    else
        cost = cost +
    BUS_ADD_SERVICE_FEE*( connectionNum-10);
    */
}
else
{
    // Incorrect customer code
}
```

You can also use the switch statement as the textbook does : pp 218-232

## How to get a character from the input

```
int i = console.nextInt();
```

```
char customerCode;  
customerCode = console.next().charAt(0);
```

## Syntax for Selection Statement

```
if (expression)
    statement;
```

```
if ( condition )
    statement1;
else
    statement2;
```

```
if (condition1) {
    block1
}
else if (condition2) {
    block2
}
else {
    block3
}
```

```
switch (expression)
{
    case value1: statements1
        break;
    case value2: statements2
        break;
    ...
    case valuen: statementsn
        break;

    default: statements
}
```