Get Smart: With Java Programming

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```
System.out.println("WELCOME TO THIS COURSE\n");
```

CONDITIONAL STATEMENTS

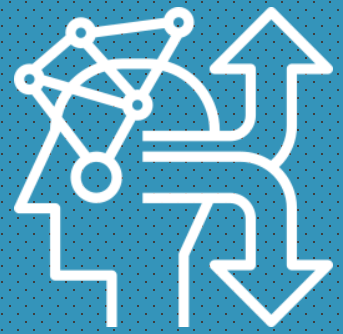
(Decision Making)

CONDITIONAL STATEMENT

WHAT TO EXECUTE & WHEN?

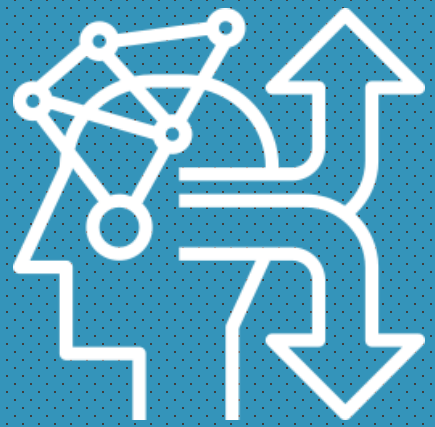
Choose a path or a behavior depending on the boolean‘s value.

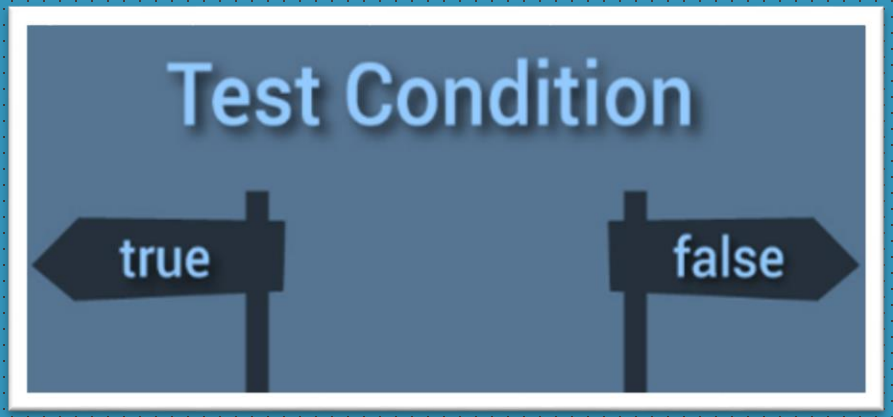
Instead of executing line by line through the whole code, we choose which set of instructions should be executed



CONDITIONAL STATEMENT

When we need to choose
which set of instructions *(statements)*
are obeyed *(executed)*
according to a condition
that is either true or false
(using equality and relational operators)






Available Transactions
Select your transaction.
Withdrawal
Deposit
Balance Inquiry
Transfers & Payments
Set Preferences
Cancel
Additional Options >

Buffet

Price for ages 15 and more = 18JD’s
Children's Price: ages 6-14 = 10JD’s
Kids Price: ages 5 and under = free 0JD’s

Electricity Bill

Calculate the total price

Units consumed

Price (Per Unit)

- *From 0-500 Units = 0.2JD'S PER UNIT*
- *From 500-1000 Units = 0.5JD'S PER UNIT*
- *More than 1000 Units = 0.8JD'S PER UNIT*

Additional Fees (5JD's)

Tax (20% of the total bill including the additional fees)

CONDITIONAL STATEMENT

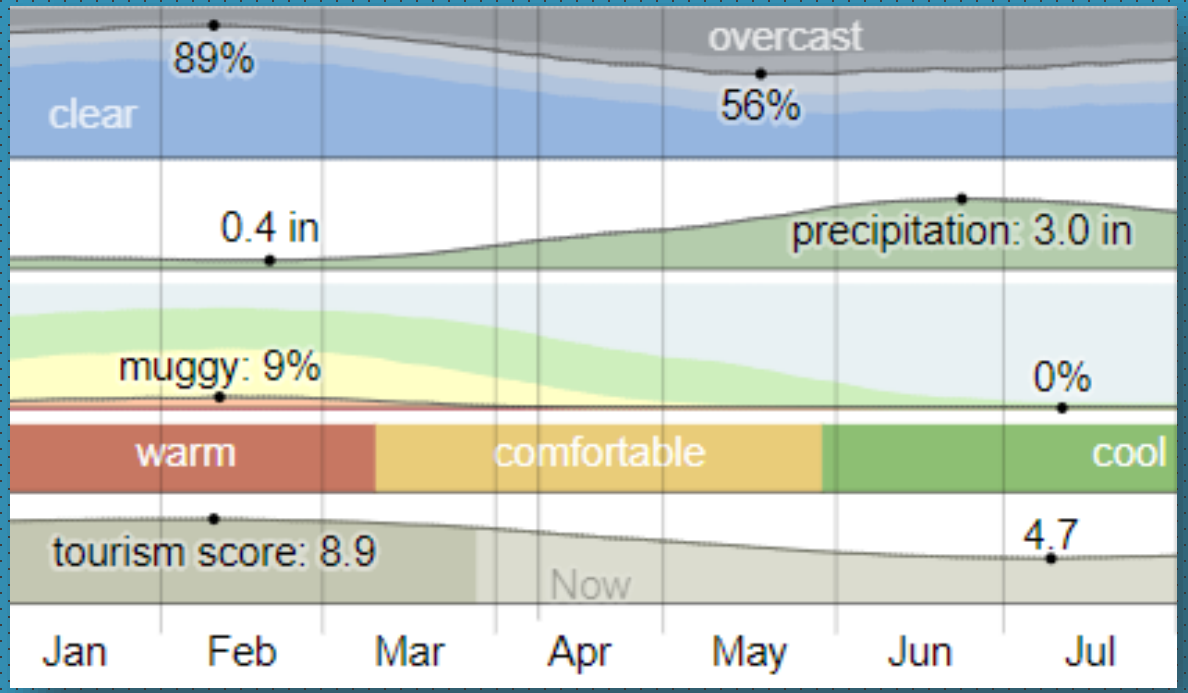
```
1   if ( CONDITION )
2   { // 'if' BLOCK STARTS HERE
3         STATEMENT1;
4         STATEMENT2;
5         ...
6         ...
7   } // 'if' BLOCK ENDS HERE
```

STATEMENT1 & STATMENT2 are only executed if ‘CONDITION’ is true, but if ‘CONDITION’ is false, any code from line ‘2’ to line ‘7’ is ignored completely

E.g. A program for a automated air condition that checks if the weather is hot or cold.

```
double outTemp, inTemp;
boolean isCold = outTemp < 12;

if(isCold) {
System.out.println("It's cold");
inTemp = 18+(33/outTemp);
}
```



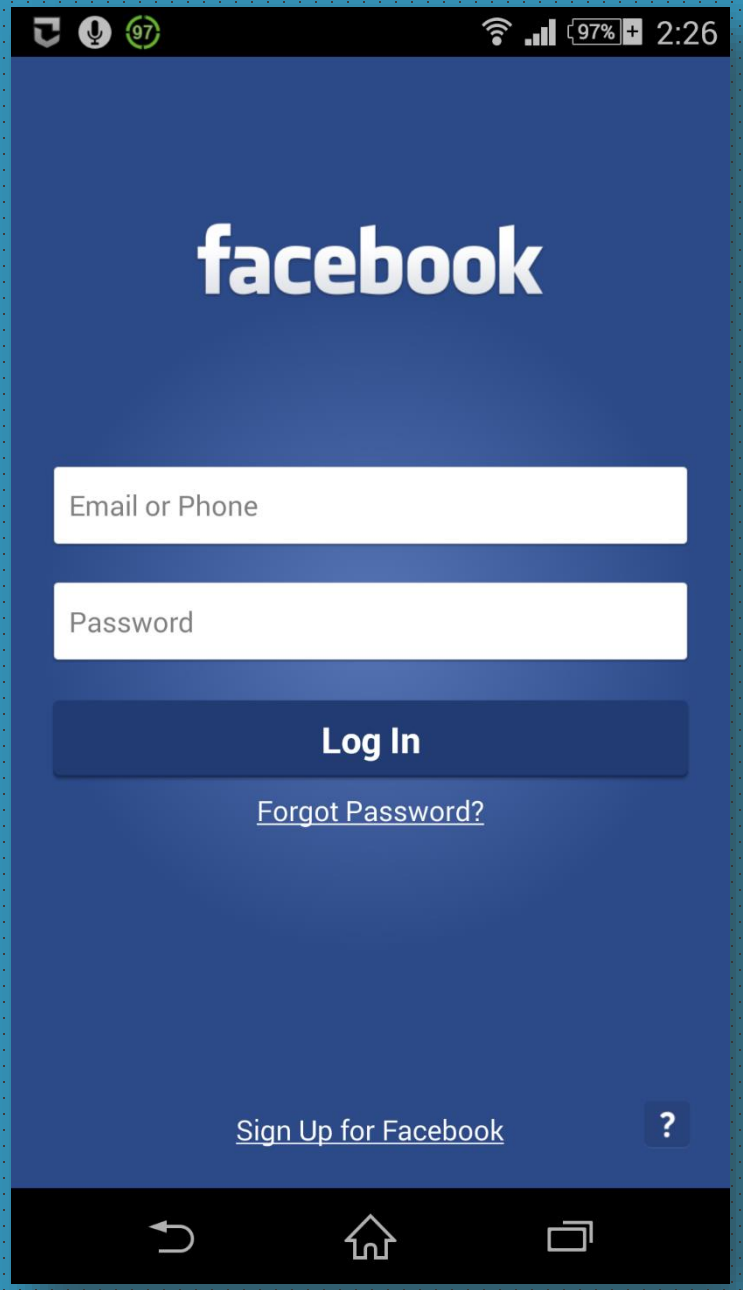
https://weatherspark.com/

A program that checks if the user has entered the correct password

```
Scanner input = new Scanner(System.in);
String correctPassword = "yaman123";
System.out.println("ENTER YOUR USERNAME");
String username = input.nextLine();

System.out.println("ENTER YOUR PASSWORD");
String enterPassword = input.nextLine();

boolean isValid = (enterPassword.equals(correctPassword));
if (!isValid) {
System.out.println(“YOUR PASSWORD IS INCORRECT" );
        }
```



IF … ELSE

In the single ‘if’ statement if the ‘condition’ is true the following code block is executed, if not it just skips the whole block …
Now if want to make the program execute a different code if the ‘condition’ is false we use the ‘if – else’ statement

```
1   if(condition2) { statement1; }
2   else { statement1; }
```

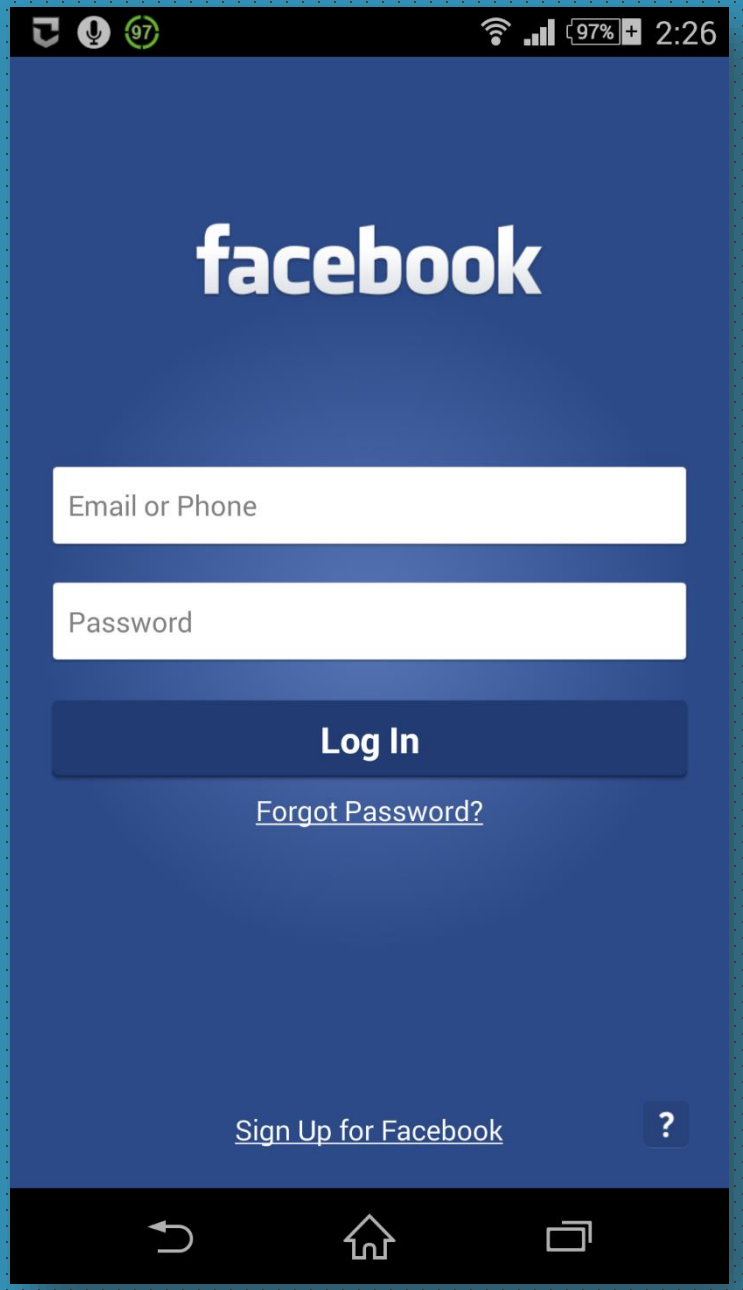
Statement1 is only executed if ‘condition2’ is true, but if ‘condition2’ is false, then the ‘else’ part is executed which is ‘statment1’ on line 2 …

A program that checks if the user has entered the correct password

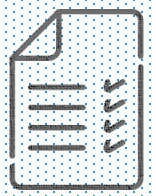
```
Scanner input = new Scanner(System.in);
String correctPassword = "yaman123";
System.out.println("ENTER YOUR USERNAME");
String username = input.nextLine();

System.out.println("ENTER YOUR PASSWORD");
String enterPassword = input.nextLine();

boolean isValid = (enterPassword.equals(correctPassword));
if (isValid) {
System.out.println(“Success Login" );
        }
else { System.out.println(“Wrong Password”); }
```

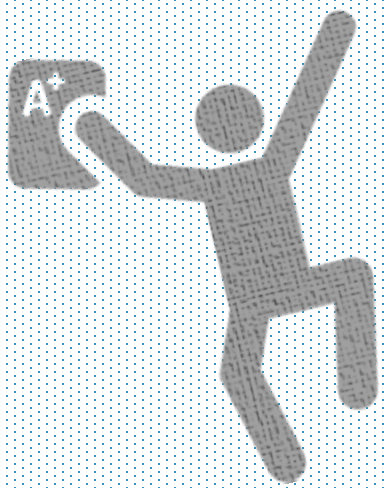


IF … ELSE



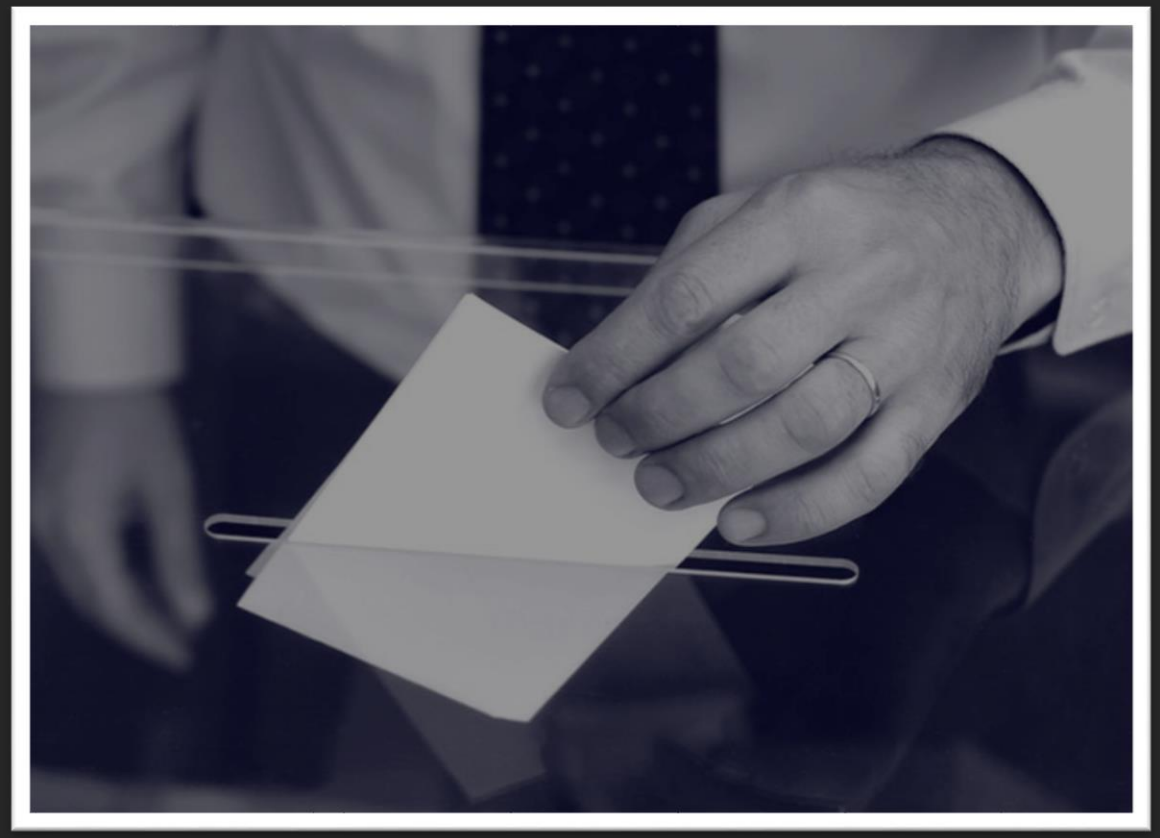
Example: A program that displays “Passed” if the student passed the exam , and displays “Failed” if the student failed

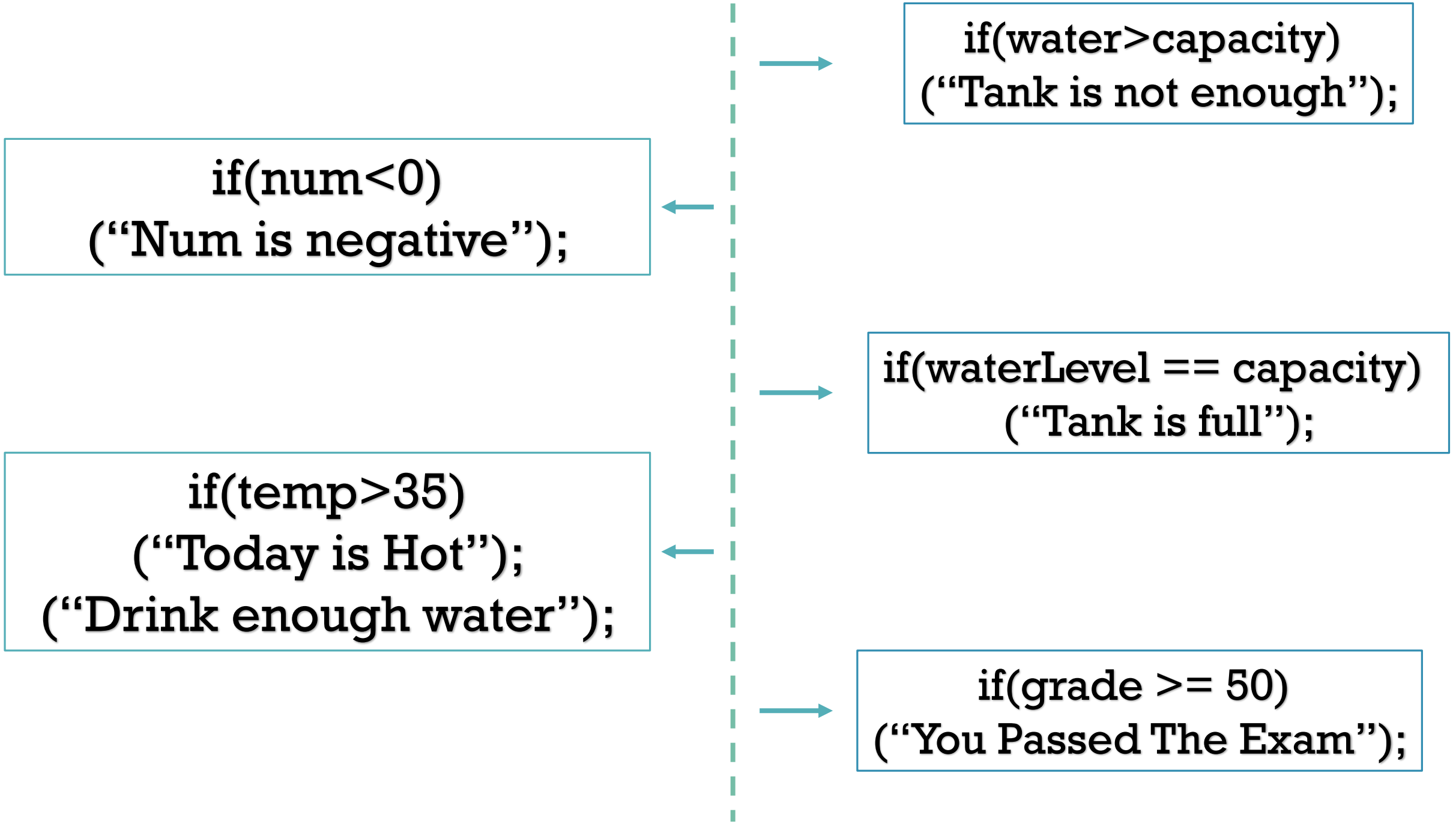
```
IF (GRADE >= 50)
(“PASS”);
ELSE
(“FAILED”);
```



A program that checks if the candidate eligible for elections

1. INPUT AGE
2. boolean isQualified = age>=30;
3. if (isQualified) then take his info
4. Else output a rejection message




if(water>capacity)
("Tank is not enough");
if(num<0)
("Num is negative");
if(waterLevel == capacity)
("Tank is full");
if(temp>35)
("Today is Hot");
("Drink enough water");
if(grade >= 50)
("You Passed The Exam");

A Program To Monitor The Tire's Status

```
int pressure = input.nextInt();
boolean isTiresOk =
      pressure >= 34
   && pressure <= 37;

if(!isTiresOk)
System.Out.Println("CHECK TIRES");
```

ELSE IF STATEMENT

```
if(grade>=80 && grade<=100) System.out.println("A");
else if(grade>=65) System.out.println("B");
else if(grade>=55) System.out.println("C");
else if(grade>=50) System.out.println("D");
else if(grade>=0 && grade<=49) System.out.println("F");
```

For example, if the input of 'grade' was 77, then the output will be: 'B'

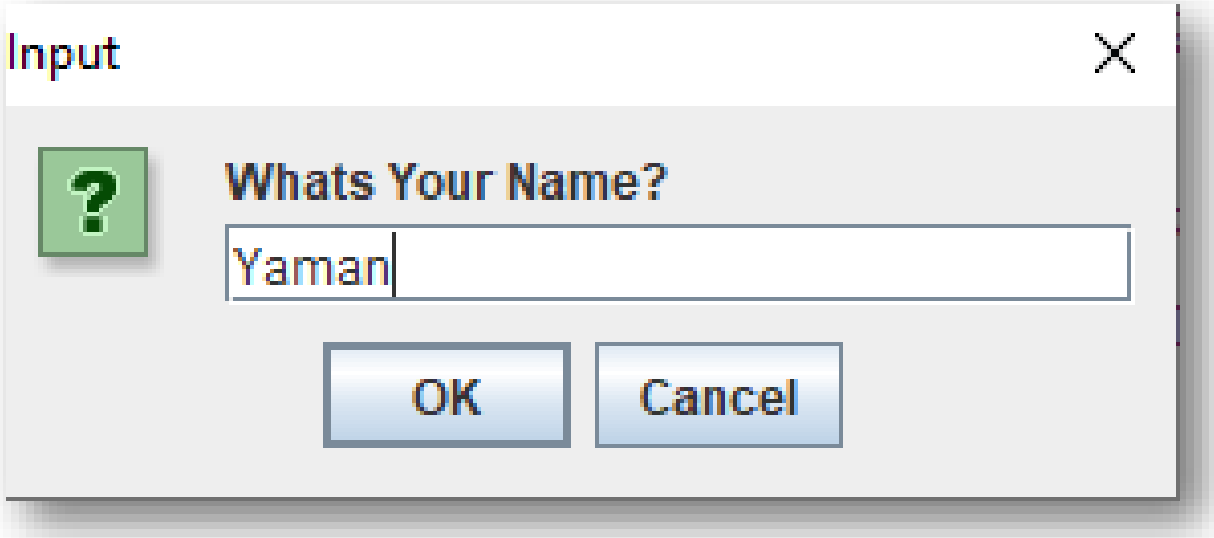
If the 'grade' was 43, the output will be: 'F'

When To Use The ELSE IF ?

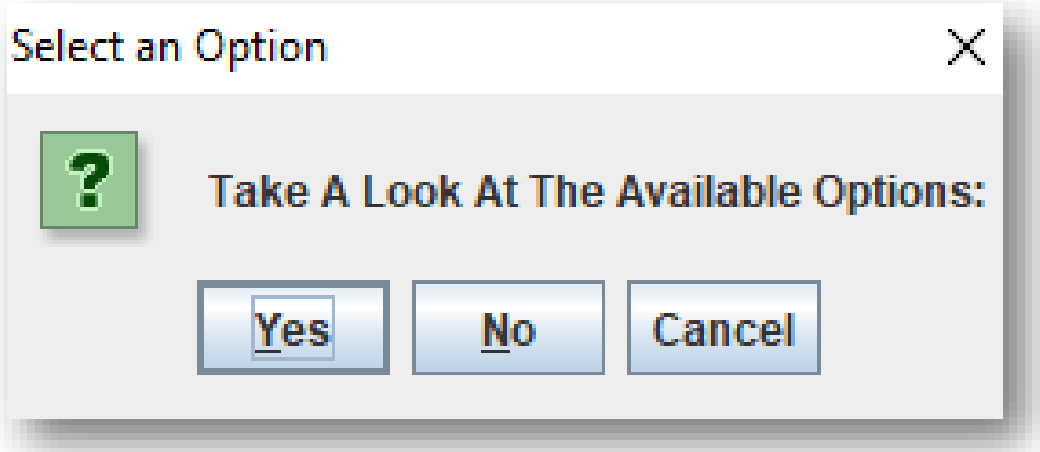
- Used to test various conditions (cases)
- Only one case will be executed
- Similar to 'switch' statements

Letter grade	Percentage
A	80 – 100
B	65 – 79
C	55 – 64
D	50 – 54
F	0 – 49

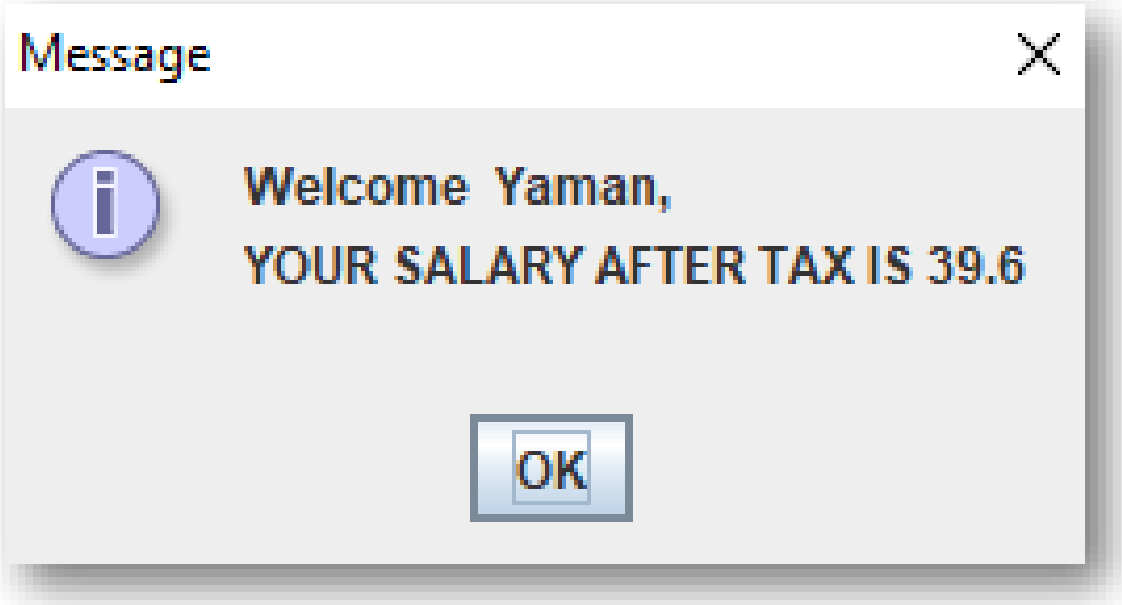
```
if(num<0)
("Num is negative");
else if(num == 0)
("Num is ZERO ");
else
("Num is Postive");
```



input dialog box



confirm dialog box



message dialog box

The JOptionPane class is used to provide standard dialog boxes such as
- message dialog box,
- confirm dialog box,
- input dialog box.

These dialog boxes are used to display information or get input from the user.

```
//import javax.swing.JOptionPane;

String name = JOptionPane.showInputDialog("Whats Your Name?");
      int salary = Integer.parseInt( JOptionPane.showInputDialog("Salary?"));

       JOptionPane.showMessageDialog(null, "Welcome  " + name + ", \nYOUR SALARY AFTER TAX IS " + (salary*1.2) );
       int choice = JOptionPane.showConfirmDialog(null, "Take A Look At The Available Options:"); // 0 IS YES , 1 IS NO

       if(choice==0) {
          JOptionPane.showMessageDialog(null, "MENU ITEM [1]\nMENU ITEM [2]\nMENU ITEM [3]\n" );
       }
```

Enter Coins:

CHOOSE:
10: KitKat (0.5)
15: Oreo (0.25)
20: Ras Al-Abed (0.1)
25: Laban (0.5)

Enter Coins: 0.1

Enter:
10: KitKat (0.5)
15: Oreo (0.25)
20: Ras Al-Abed (0.1)
25: Laban (0.5)

If balance < choicePrice
“Not Enough Money”

Change = balance-choicePrice

Health Insurance:

Married: $80
- Children 1-3 => $20 Per Child
- Children 4+ => $40 For The First 2, Then $10 Per Child

Single: $50

5 children -> 40 + (children-2)*10

Electricity Bill

Calculate the total price

Units consumed

Price (Per Unit)

- *From 0-500 Units = 0.2JD'S*
- *From 500-1000 Units = 0.5JD'S*
- *More than 1000 Units = 0.8JD'S*

Additional Fees (5JD's)

Tax (20% of the total bill including the additional fees)

“YOU HAVE THE FOLLOWING TWO OPTIONS 3-MONTHS OR 12-MONTHS “
--- 3 Months: 60JDs // ---12 Months: 160JDs

"WOULD YOU LIKE A PT (1-YES) - (2-NO)”
IF YES "HOW MANY SESSIONS PER WEEK? “
--- Each Session: 5JDs

sessions * 4(weeks) * (3 or 12)

BMI Formula

$$\text{BMI} = \text{weight (kg)} / [\text{height (m)}]^2$$

Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. The interpretation of BMI for people 16 years or older is as follows:

BMI	Interpretation
Below 18.5	Underweight
18.5-24.9	Normal
25.0-29.9	Overweight
Above 30.0	Obese

BMI Formula

BMI = weight (kg) / [height (m)]^2

BMI	Interpretation
Below 18.5	Underweight
18.5-24.9	Normal
25.0-29.9	Overweight
Above 30.0	Obese

1 lb = 0.45359237 kg

1 kg = 2.20462226 lb

1 m = 39.3700787402 in

```
    Scanner input = new Scanner(System.in);

    // Prompt the user to enter weight in pounds
    System.out.print("Enter weight in pounds: ");
    double weight = input.nextDouble();

    // Prompt the user to enter height in inches
    System.out.print("Enter height in inches: ");
    double height = input.nextDouble();

    final double KILOGRAMS_PER_POUND = 0.45359237; // Constant
    final double METERS_PER_INCH = 0.0254; // Constant

    // Compute BMI
    double weightInKilograms = weight * KILOGRAMS_PER_POUND;
    double heightInMeters = height * METERS_PER_INCH;
    double bmi = weightInKilograms /
      (heightInMeters * heightInMeters);

    // Display result
    System.out.println("BMI is " + bmi);
    if (bmi < 18.5)
      System.out.println("Underweight");
    else if (bmi < 25)
      System.out.println("Normal");
    else if (bmi < 30)
      System.out.println("Overweight");
    else
      System.out.println("Obese");
  }
```

Single if( )	If the condition is true the block of code will be executed, if not it will just jump to the next statement after the whole block.	Used when there is a single condition to be checked (e.g. Check if password==true)
if( ) { … } else { … }	statements are executed when condition is true. If condition is false, then else part statements are executed.	Used when there is a condition & its opposite (e.g. odd/even) (Pass/fail)
if ( ) { … } else if ( ) { …} else { … }	If the first condition is true the first block of code will be executed, if not it will jump to the next 'else if' if the condition is true the block of code will be executed, if not it will jump to the else part.	Used to test multiple similar conditions that only one of them can be true at once (e.g. Relations between numbers) (Rank of GPA) (Options)

The if statement is called a single-selection statement because it selects or ignores a single action.

The if…else statement is called a double-selection statement because it selects between two different actions

Selection keywords

Used to execute some code (statements) only if a specific condition is met (true).

The question will contain a condition or "if" keyword, or "between x and y" or "Include/Exclude"

e.g. #of emp in their twenties , #of red cars in the park, if he is above 18, if the number is larger than, The program should then print the number of vowels

The number of employees in the company whose salaries are between 1000.00 JD and 2000.00 JD . Exclude Odd numbers

if

Used when a code should be executed only when a specific condition is met.
Executes the code (statements) only if a condition is true, and skips the code if it is false.

```
if ( x == 3 ) { //do this; }
```

else

Used when a condition has an opposite or another situation.
Executes the code (statements) if only a condition is false.

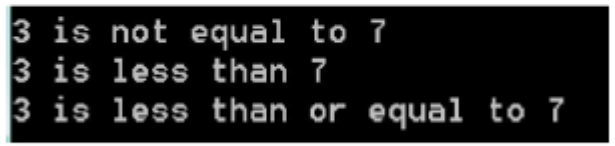
```
if ( x == 3 )
{ //do this if true; }
else
{ //do this if false; }
```

else if

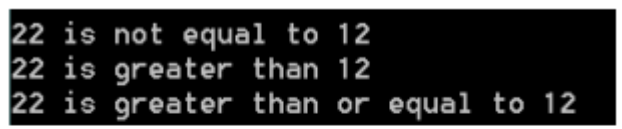
Used when there is further conditions and different code (statements) for each condition.

```
if ( opt == 90 )
{ //do this if true; }
else if (opt ==80)
{ //do this if  true; }
else if (opt ==70)
{ //do this if  true; }
else
{ //do this if false; }
```

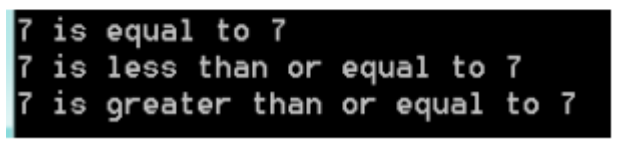
When the input is 3 & 7



When the input is 22 & 12



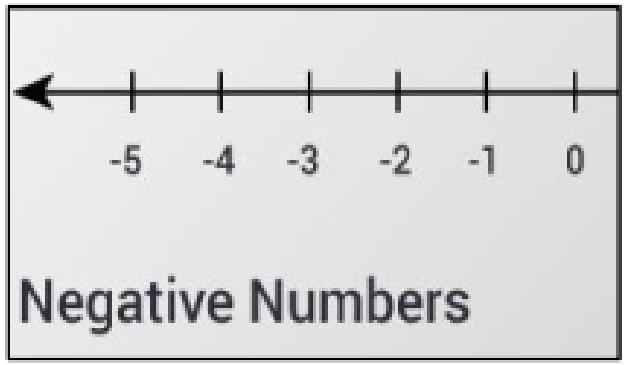
When the input is 7 & 7



❖ Absolute value

To calculate the absolute value of a number first we check if the number is positive it remains the same, if the number is negative then the number should be multiplied by -1 to make it positive.

```
if ( number < 0 ) //NEGATIVE
{ number = number * -1;}
```



Challenge: Based on a user's order, work out their final bill.

Small Pizza: $15
Medium Pizza: $20
Large Pizza: $25

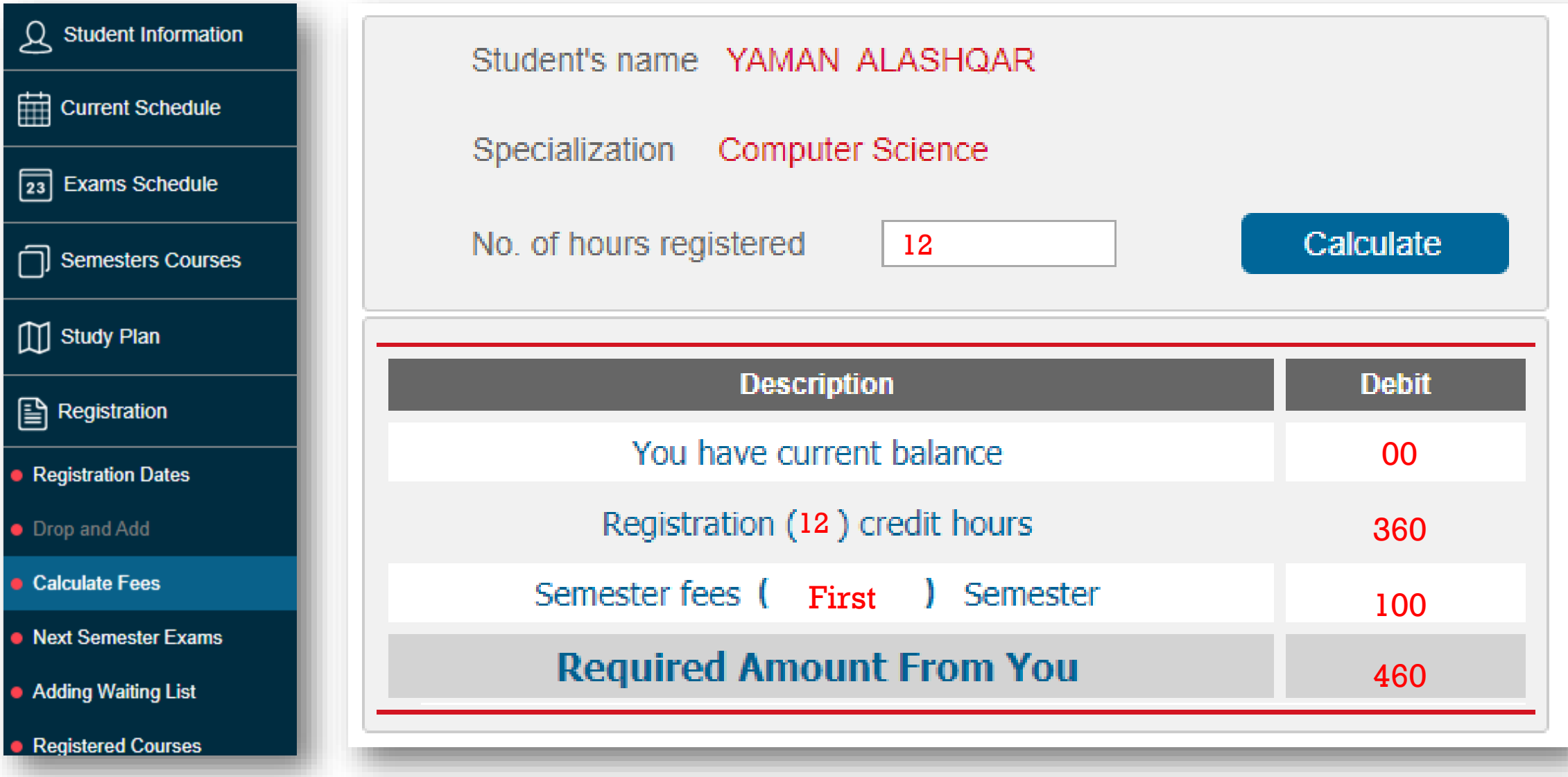
Pepperoni for Small Pizza: +$2
Pepperoni for Medium or Large Pizza: +$3

Extra cheese for any size pizza: + $1

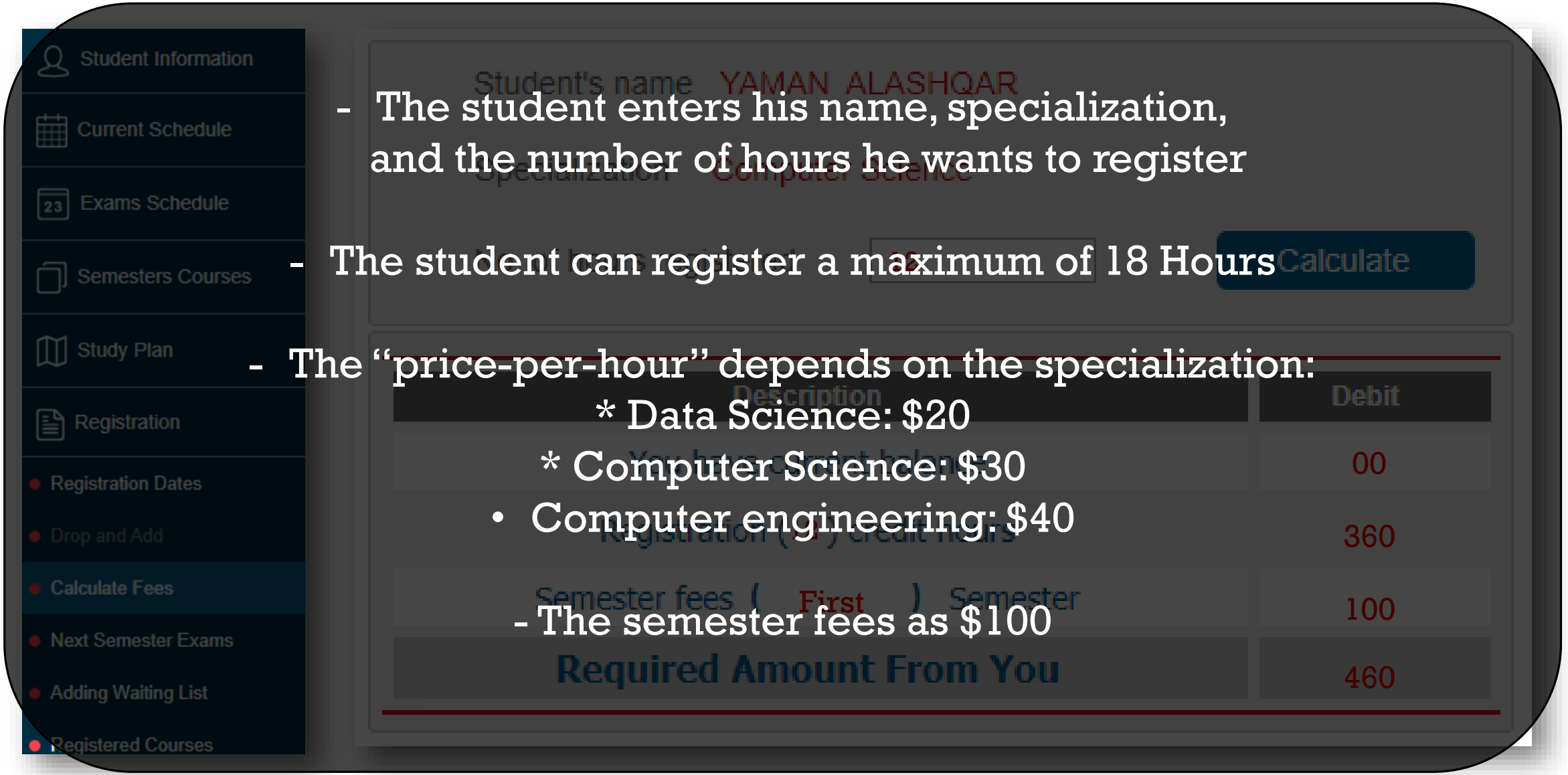
Example Input
size = "L"
add_pepperoni = "Yes"
extra_cheese = "No"

Example Output
Your final bill is: $28.

Calculate Student Fees



Calculate Student Fees



- The student enters his name, specialization, and the number of hours he wants to register

- The student can register a maximum of 18 Hours

- The "price-per-hour" depends on the specialization:
  * Data Science: $20
  * Computer Science: $30
  - Computer engineering: $40

- The semester fees as $100