2: Basic Building Blocks: Binary Selection Worksheet

Aim:

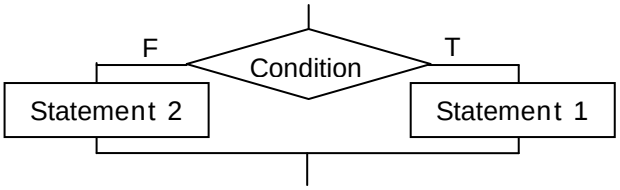
The aim of this worksheet is to:
- understand binary selection control structure
- create a working JavaScript program that contains a binary selection

Control structure - Binary Selection

The control structure that allows "two pathways" for different circumstances is called a Binary Selection. It is also called IF-THEN-ELSE Selection. Below are examples of Binary structures in Pseudocode and flowcharts.

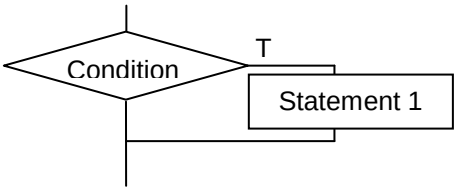
Binary Selection (with two pathways)

```
IF (condition TRUE ) THEN
       (statement sequence 1)
ELSE
       (statement sequence 2)
ENDIF
```



Binary Selection (with one pathway)

```
IF (condition TRUE ) THEN
       (statement sequence 1)
ENDIF
```



Binary Selection (Nested Statements)

```
IF (condition TRUE ) THEN
   IF (condition TRUE ) THEN
        (statement sequence 1)
   ELSE
        (statement sequence 2)
   ENDIF
ELSE
   (statement sequence 3)
ENDIF
```

Example Binary Selection

Problem Statement

Create a program that will input two number and output the biggest

Solution – IPO chart – Figure 1

Input	Process	Output
Two numbers	IF number 1 bigger than Number two print Number 1 bigger else print number two bigger	Biggest number

Solution – Algorithm – Figure 2

Pseudocode

```
BEGIN
    Enter Number 1
    Enter Number 2
    IF Number 1 > Number 2 THEN
            PRINT Number1 is bigger
    ELSE
            PRINT Number2 is bigger
    ENDIF
END
```

Activity 1: Draw a Flowchart

Draw the flowchart for the “Binary control (Nested Structures) on the previous page.

Activity 2: Draw a Flowchart

Draw the flowchart for the pseudocode “Solution algorithm” above.

Activity 3: Create the JavaScript program

Create the JavaScript code for the Example Problem above and save it to the appropriate Solutions folder in your mobile website.

1. Copy the HTML in Figure 3 into the section tag of the **binarySolAct3.html** file
2. **Add** the **comments** to the top of the pages including your name and detail of the page/code

Javascript Code – Figure 3

```
Binary Selection<br>
<form name="form">
    Number one: <input name="num_one" type="text" id="num_one"/><br>
    Number two<input name="num_two" type="text" id="num_two" /><br>
    <input type="button" value="submit"   onClick="process()" />
</form>
<br>
Answer <div id="answer">  </div>
<script type="text/javascript">
    function process(){
        var num1 = document.form.num_one.value;
        var num2 = document.form.num_two.value;
        if(num1 > num2){
            document.getElementById('answer').innerHTML = "Number one is bigger: " + num1;
        } else {
            document.getElementById('answer').innerHTML = "Number two is bigger: " + num2;
        }
    }//end of function
 </script>
```

Activity 4: Test your program

Test the Javascript program from Activity 3, complete the table below and answer the question using following test data.

Number 1	Number 2	Expected output	Actual output
5	42	Number 1: 42 is bigger	
34	37	Number 2: 37 is bigger	
12	12	Numbers are equal	

a) Does the program produce the expected output?

_____

_____

b) Describe what happens when no data is in the text boxes.

_____

_____

_____

Activity 5: Modify the Javascript code for equal numbers

The following modified algorithm displays “Numbers are equal” if the 2 numbers entered are the same. It includes a nested Binary Selection

```
BEGIN
  Enter Number 1 and enter Number 2
  IF Number1 = Number2 THEN
    PRINT Numbers are equal
  ELSE
    IF Number 1 > Number 2 THEN
       PRINT Number1 is bigger
    ELSE
       PRINT Number2 is bigger
    END IF
  END IF
END
```

a. Draw the flowchart algorithm for the above Pseudocode
b. Modify your Javascript code (from Activity 3) to include the above modifications and put the new modified code into the section tag of the **binarySolAct5.html** file
c. **Add** the **comments** to the top of the pages including your name and detail of the page/code

Activity 6 Extension: Modify code for no data entered

Change the program, so that when no data is entered into both textboxes an error message “no data entered” is displayed.

Put into the section tag of the **binarySolExt.html** file