# Lab 6

# JavaScript Conditions, Loops, and Debugging

45 points  
**You can skip two tasks in this lab and still earn full credit.**

Purpose/Knowledge/Skills: Professional programmers use variables extensively in programs they create or maintain. In this lab, you’ll become familiar with variables, data types, and how to convert user input to numeric types for processing.

## Task 1: Conditions (5 points, 0.5 points per problem)

6.1.1. Given the variable declarations

x = 2;

y = -10;

z = 6;

What are the results of the following relational expressions?   
Please list true or false after each relational statement **before** creating any program code.

|  |  |  |  |
| --- | --- | --- | --- |
| Problem statement | Relational Expression | Expected Result | Result from running  JS program |
| Given | x == 2 | True |  |
| Given | y < -20 | False |  |
| a | x == 4 | . . . |  |
| b | x == y |  |  |
| c | x == z |  |  |
| d | y == z |  |  |
| e | x + y > 0 |  |  |
| f | x – z != 0 |  |  |
| g | y \* y <= z |  |  |
| h | y / y == 1 |  |  |
| i | x \* (y + 2) > y - (y + z) \* 2 |  |  |
| j | x <= y |  |  |

6.1.2. Create a JavaScript program that outputs twelve lines with **true** or **false** based on each expression. For example: console.log ("x == 4? " + (x == 4)); .

6.1.3. If your analysis for statements a-j is different than the computer output, double-check your work (and program) until both agree.

Rubric:

* Student name and date is in a comment on the first line of the program: -5 points if fails
* True/False statements correct: 5 points, about 0.5 points per statement

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your HTML and/or JS file, here:

## Task 2: if statements (5 points)

Create an HTML + JS page, or run the JavaScript code in <https://repl.it/repls/javascript>:

// JavaScript program by [Student name] [Today's date]  
inputString = prompt("Input a value for variable a");

// Convert the input to an int.  
a = parseInt(inputString);

console.log("Variable a has value " + a);  
if (a > 5)   
 console.log("a is bigger than five!");

When this works and runs as expected, add more if and console.log statements so the program reports, all in a single program run:

2a. If a is smaller than 0

2b. If 50 is bigger than a

2c. If a + 1 is less than 3

2d. If a - 5 is smaller than 0

2e. If a \* a \* a is positive

Rubric:

* Student name and date is in a comment on the first line of the program: -5 points if fails
* Five conditions with appropriate output: 1 point each

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your .html and/or .js files here:

## Task 3: Switch statements (5 points)

Rewrite the following if-else-if statement as a switch statement. Create an HTML + JS page, or run the JavaScript code in <https://repl.it/repls/javascript> .

// JavaScript program by [Student name] [Today's date]

selection=prompt("Enter your selection");

if (selection=="A")

console.log("You selected A.");

else if (selection=="B")

console.log("You selected B.");

else if (selection=="C")

console.log("You selected C.");

else if (selection=="D")

console.log("You selected D.");

else

console.log("You selected something else.");

Rubric:

* User input to test switch statement, program works: 2 points
* Five switch conditions with appropriate output: 2 points
* Switch conditions terminate correctly - output is only one line per case: 1 points
* Both screenshot and code included: -5 points if fails
* Student name is a comment in both HTML and JS files: -5 points if fails

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your .html and/or .js files here:

## Task 4: Desk-check Loops (5 points)

For each of the code examples, please:

1. Desk-check the code to predict the output and number of iterations.
2. Run the code to confirm/correct your guesses.   
   Because of the way Word mangles source code, please type in each example  
   rather than copying and pasting.
3. Use breakpoints and Visual Studio or in-browser debugging to follow program execution  
   through at least one loop.

For one of the examples:

1. Take a screenshot showing Visual Studio or the browser debugger with program execution paused.   
   You only need one screenshot for this task, with only one loop paused.

|  |  |
| --- | --- |
| Task 4.1. Code: | x = 1;  while (x < 11) {  Console.log(x + " ");  x += 1;  } |
| Desk-check the code.  That is: step through the code one line at a time. Think of it how the computer would. Use this to predict what happens when the program runs.  What do you predict the output will be? |  |
| How many times will the loop iterate? |  |
| Run the code on the computer.  What is the actual output? |  |
| Screenshot showing a Visual Studio or browser breakpoint for debugging: |  |

|  |  |
| --- | --- |
| Task 4.2. Code: | x = 10;  while (x > 0) {  Console.log(x);  x = x - 2;  } |
| Desk-check the code.  That is: step through the code one line at a time. Think of it how the computer would. Use this to predict what happens when the program runs.  What do you predict the output will be? |  |
| How many times will the loop iterate? |  |
| Run the code on the computer.  What is the actual output? |  |
| Screenshot showing a Visual Studio or browser breakpoint for debugging: |  |

|  |  |
| --- | --- |
| Task 4.3. Code: | max = 10;  while (max < 10) {  Console.log("count down: " + max);  max––;  } |
| Desk-check the code.  That is: step through the code one line at a time. Think of it how the computer would. Use this to predict what happens when the program runs.  What do you predict the output will be? |  |
| How many times will the loop iterate? |  |
| Run the code on the computer.  What is the actual output? |  |
| Screenshot showing a Visual Studio or browser breakpoint for debugging: |  |

Rubric:

* Student name and date is in a comment on the first line of the program: -5 points if fails
* Loops desk check: 3 points
* Loops output: 1 point
* Loops debugging screenshot(s): 1 point

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your .html and/or .js files here:

## Task 5: While loops (5 points)

Please correct the errors in the following program so it works correctly.

// [Student name] [today's date]

// This code contains ERRORS!

count = 1;

total = 0;

while (count <= 100)

total += 3;

console.log("The sum of the numbers 1 - 100 is ");

console.log(total);

Rubric:

* Student name and date is in a comment on the first line of the program: -4 points if fails
* Screenshot and code included: -5 points if fails
* While loop counts from 1 to 100: 2 points
* Total (5050) computed correctly: 3 points

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your HTML and/or JavaScript files here:

## Task 6: for loops (5 points)

Create a JavaScript program that counts from 1 to 20 by twos. All initialization, continuation, and initialization code must be in the for statement.

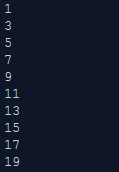
Code structure:

// JavaScript program by [Student name] [Today's date]

for ( [initializer]; [continuation condition]; [update statement])

console.log(i)

Sample output:



Rubric:

* Count output correct: 2 points
* All code is in a single for loop statement: 3 points
* Both screenshot and code included: -5 points if fails
* Student name is a comment in both HTML and JS files: -5 points if fails

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your .html and/or .js files here:

## Task 7: w3schools JavaScript review (5 points)

Please read the JavaScript tutorial at w3schools at <https://www.w3schools.com/js/default.asp>. Complete the following sections and paste a screenshot of one “try it yourself” or “Exercise” activity from each.

JS Comparisons

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

JS Conditions

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

JS Switch

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

JS Loop For

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

JS Loop While

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

JS Break - don’t worry about label references

Paste a screenshot of a completed “Try It Yourself” or “Exercise” activity here:

Rubric:

* Six screenshots, one per section: about 1 points each

## Task 8: Comprehensive Exercise – Calculate Factors (10 points)

Write a program that allows the user to input an integer. Use a loop to print the factors of that number separated by the word "and". For example, the factors of the number 24 should print as the following:



You may assume that the input value is greater than 0.

Your program should print nothing if the empty string ("") is passed.

Your name should always be a comment near the top of the HTML and/or JavaScript file.

Hints:

* You can assume the user will input a positive integer.
* Number n1 is a factor of userInput if ((userInput % n1) == 0)
* 1 is always a factor of everything

Rubric:

* Student name and date is in a comment on the first line of the program: -10 points if fails
* Input to variable: 1 points
* Loop to test factors: 1 points
* Factors calculation/condition: 2 points
* Output on one line: 2 points
* No extra “and” on start/end of factors list: 2 points

Please paste a screenshot of a successful program run, and copy-and-paste the source code from your .html and/or .js files here: