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Exercise Sheet Resolution nº2
Conditionals and Loops

Use Visual Studio Code to solve the following exercises:

1. Conditional Statements:

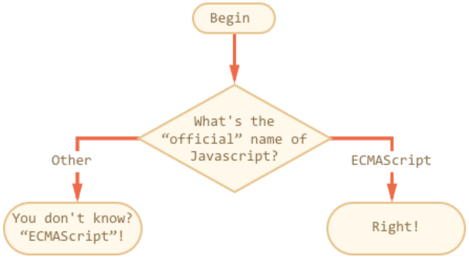
a. Will the log be shown in the console?

```
if ("0") {
  console.log( 'Hello' );
}
```

Yes, it will be shown.

Any string, except an empty one (and "0" is not empty) becomes true in the logical context.

b. Using an if..else block, write the code that asks: "What's the“ official ”name of Javascript?”. If the visitor types “ECMAScript”, send “Right!”, Otherwise, the output: “You don ' t know? “ECMAScript”! ”


Begin
What's the “official” name of Javascript?
Other
ECMAScript
You don't know? “ECMAScript”!
Right!

```
let value = prompt('What is the "official" name of JavaScript?', '');

if (value == 'ECMAScript') {
   alert('Right!');
} else {
   alert("You don't know? ECMAScript!");
}
```

c. Using an if..else block, write the code that gets a number via prompt and then shows on alert:

i. 1, if the value is greater than zero,
ii. -1, if less than zero,
iii. 0, if equal to zero.

In this task, we assume that the entry is always a number.

```
let value = prompt('Write a number', 0);

if (value > 0) {
  alert( 1 );
} else if (value < 0) {
  alert( -1 );
} else {
  alert( 0 );
}
```

d. Rewrite this if with the ternary operator '?':

```
if (a + b < 4) {
  result = 'Below';
} else {
  result = 'Over';
}
```

```
result = (a + b < 4) ? 'Below' : 'Over';
```

e. Rewrite the next if ... else using multiple ternary operators '?'. For easy reading, it is recommended to split the code into several lines.

```
let message;

if (login == 'Employee') {
  message = 'Hello';
} else if (login == 'Director') {
  message = 'Greetings';
} else if (login == '') {
  message = 'No login';
} else {
  message = '';
}
```

```
let message = (login == 'Employee') ? 'Hello' :
  (login == 'Director') ? 'Greetings' :
  (login == '') ? 'No login' :
  '';
```

2. Logical operators:

a. What is the output for each line of code?

```
console.log( null || 2 || undefined );
console.log( alert(1) || 2 || alert(3) );
console.log( 1 && null && 2 );
console.log( alert(1) && alert(2) );
console.log( null || 2 && 3 || 4 );
```

console.log(null || 2 || undefined);
The answer is 2, this is the first true value.

console.log(alert(1) || 2 || alert(3));
The answer: first 1 and then 2.
The call to alert does not return a value, or rather, it returns undefined.
The first OR || evaluates the left alert (1). This shows the first message with 1.
The alert returns undefined, so OR moves to the second operand looking for a true value. The second operand 2 is true, then the execution is interrupted, 2 is returned and then shown by the external alert. There will not be 3, because the assessment does not reach the alert (3).

console.log(1 && null && 2);
The answer: null, because it is the first false value in the list.

console.log(alert(1) && alert(2));
The answer: 1, then undefined.
The alert call returns undefined (only shows a message, so there is no significant return). Because of this, && evaluates the left operand (shows 1), and immediately stops, because undefined is a false value. And && looks for a false value and returns.

console.log(null || 2 && 3 || 4)
Answer: 3
The && precedence is greater than ||, so it is performed first.
The result of 2 && 3 = 3, then the expression becomes:

null || 3 || 4

Now the result is the first truthy value: 3.

b. Write an "if" condition to verify that the age is between 14 and 90, inclusive. Inclusive means that age can reach extremities 14 or 90.

```
if (age >= 14 && age <= 90)
```

c. Write an if condition to check that the age is NOT between 14 and 90, inclusive. Create two variants: the first using NOT !, the second without it!.

```
//1ª variante
if (!(age >= 14 && age <= 90))

//2ª variante
if (age < 14 || age > 90)
```

d. Which of these alerts will be executed? What will be the results of the expressions inside if (...)?

```
if (-1 || 0) console.log( 'first' );
if (-1 && 0) console.log( 'second' );
if (null || -1 && 1) console.log( 'third' );
```

The answer: the first and the third will be executed.

```
// Executes
// The result of -1 || 0 = -1, truthy
if (-1 || 0) console.log(first);

// Does not executes
// -1 && 0 = 0, falsy
if (-1 && 0) console.log(second);

// Executes
// Operator && has a precedence greater than ||
// then -1 && 1 executes first, giving us the expression:
// null || -1 && 1 -> null || 1 -> 1
if (null || -1 && 1) console.log('third');
```

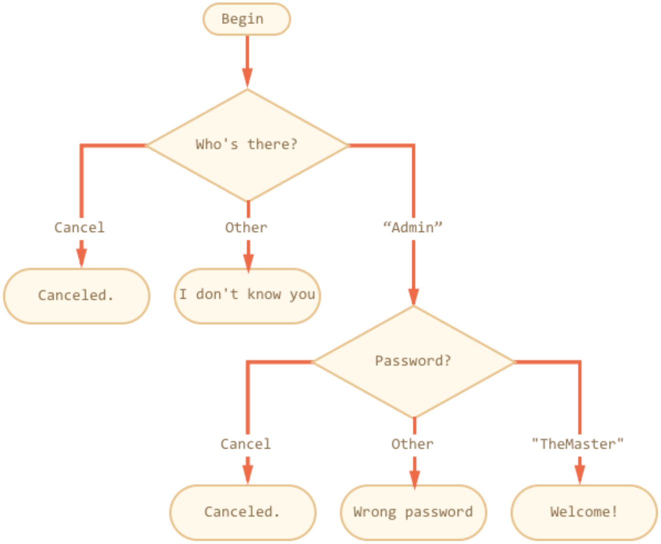
e. Write the code that asks for a login with prompt.

  i. If the visitor types "Admin", ask for a password, if the entry is an empty line or Esc - display "Canceled". If it's another, show "I don't know you".

  ii. The password is verified as follows:

    1. If it equals “TheMaster”, then show “Welcome!”,
    2. Another string value: shows "Incorrect password",
    3. For an empty string or canceled entry, show "Canceled".

  iii. The scheme:



Please use nested blocks. Observe the general readability of the code.

```
let userName = prompt("Who's there?", '');

if (userName == 'Admin') {

  let pass = prompt('Password?', '');

  if (pass == 'TheMaster') {
    alert( 'Welcome!' );
  } else if (pass == '' || pass == null) {
    alert( 'Canceled.' );
  } else {
    alert( 'Wrong password' );
  }

} else if (userName == '' || userName == null) {
  alert( 'Canceled' );
} else {
  alert( "I don't know you" );
}
```

3. Switch:

a. Write the code using an if..else block which would correspond to the following switch:

```
switch (browser) {
  case 'Edge':
    console.log( "You've got the Edge!" );
    break;

  case 'Chrome':
  case 'Firefox':
  case 'Safari':
  case 'Opera':
    console.log( 'Okay we support these browsers too' );
    break;

  default:
    console.log( 'We hope that this page looks ok!' );
}
```

```
if(browser == 'Edge') {
  alert("You've got the Edge!");
} else if (browser == 'Chrome'
 || browser == 'Firefox'
 || browser == 'Safari'
 || browser == 'Opera') {
  console.log( 'Okay we support these browsers too' );
} else {
  console.log( 'We hope that this page looks ok!' );
}
```

b. Rewrite the code below using a single switch statement:

```
let a = +prompt('a?', '');

if (a == 0) {
  console.log( 0 );
}
if (a == 1) {
  console.log( 1 );
}
if (a == 2 || a == 3) {
  console.log( '2,3' );
}
```

```
let a = +prompt('a?', '');

switch (a) {
  case 0:
    console.log( 0 );
    break;

  case 1:
    console.log( 1 );
    break;

  case 2:
  case 3:
    console.log( '2,3' );
    break;
}
```

4. Loops:

a. What is the last value logged by this code? Why?

```
let i = 3;

while (i) {
  console.log( i-- );
}
```

Resposta: 1

Each loop iteration decreases i by 1. The while (i) check stops the loop when i = 0.

Therefore, the steps of the loop form the following sequence:

let i = 3;

console.log(i--); // shows 3, decreases i to 2

console.log(i--) // shows 2, decreases i to 1

console.log(i--) // shows 1, decreases i to 0

// done, i changes to 0 and the condition is evaluated as false

b. For each loop iteration, write down the value it generates and then compare it with the solution. Do both loops alert the same values or not?

   i. The prefix form ++i:
      let i = 0;
      while (++i < 5) console.log(i);

   ii. The postfix form ++i:
      let i = 0;
      while (i++ < 5) console.log(i);

No!
First code the result is: 1 2 3 4
Second code the result is: 1 2 3 4 5

c. For each loop write down what values it will show. Then compare with the answer. Do both loops log the same values or not?

   i. The prefix form ++i:
      for (let i = 0; i < 5; i++) console.log(i);

   ii. The postfix form ++i:
      for (let i = 0; i < 5; ++i) console.log(i);

The answer: from 0 to 4 in both cases.

d. Use the for loop to generate even numbers from 2 to 10.

```
for (let i = 2; i <= 10; i++) {
  if (i % 2 == 0) {
    console.log( i );
  }
}
```

e. Rewrite the code by changing the for loop without changing its behavior (the output must remain the same).
for (let i = 0; i < 3; i++) {
console.log(`number ${i}!`);
}

```
let i = 0;
while (i < 3) {
  console.log( `number ${i}!` );
  i++;
}
```

f. Write a loop that asks for a number greater than 100. If the visitor enters another number, ask them to enter it again. The loop must request a number until the visitor enters a number greater than 100 or cancels the entry/inserts an empty line. Here we can assume that the visitor only enters numbers. There is no need to implement a special treatment for a non-numeric entry in this task..

```
let num;

do {
  num = prompt("Enter a number greater than 100?", 0);
} while (num <= 100 && num);
```

g. An integer greater than 1 is called a prime if it cannot be divided without a remainder by anything except 1 and itself. In other words, n>1 is prime if it cannot be divided by anything except 1 and n. For example, 5 is a prime because it cannot be divided without a remainder by 2, 3 and 4.
Write the code that generates prime numbers in the range 2 to n.
For n=10, the result will be 2,3,5,7.
P.S. The code must work for any n, it must not be set to any fixed value.

```
let n = 10;

nextPrime:
for (let i = 2; i <= n; i++) {

  for (let j = 2; j < i; j++) {
    if (i % j == 0) continue nextPrime;
  }

  console.log( i ); // a prime
}
```