



WEEK 4 / LESSON 7:

INTRODUCTION TO PROGRAMMING

Leonie Dunnett

LEARNING OBJECTIVES

- What is programming?
- Program Control Flow
- Read and write Pseudo Code
- What is JavaScript?
- Read and write JavaScript

TODAY'S SCHEDULE

- Introduction To Programming
- Pseudocode
 - Thermostat **code along**
 - Rock Paper Scissors **lab**
- What is JavaScript
 - Color Switcher **code along**
 - Traffic Light **lab**

INTRO TO PROGRAMMING

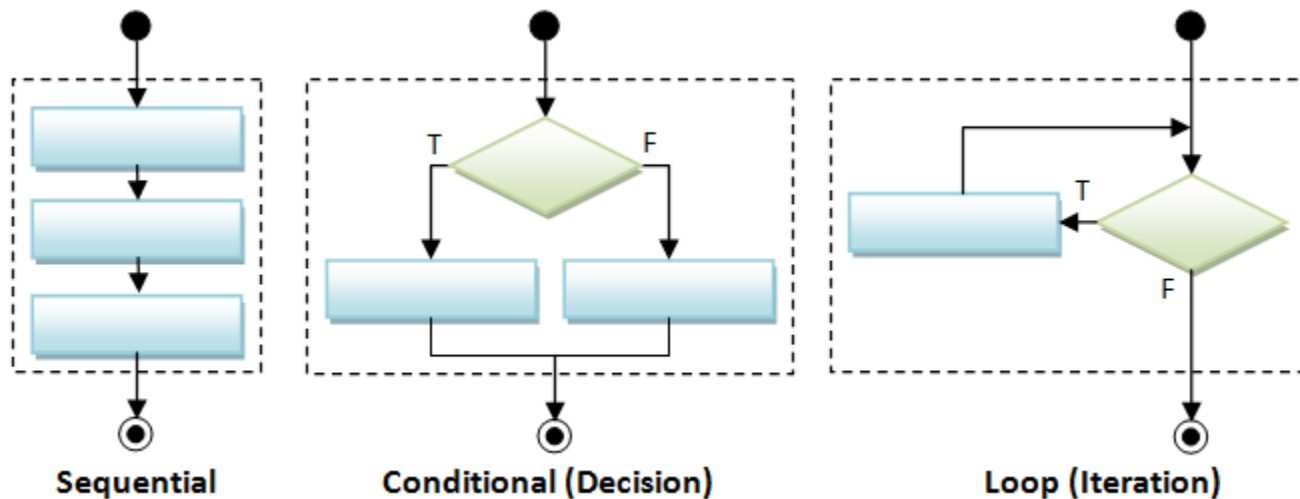
- The computer will do what you tell it to do
- Becoming a programmer is about changing how you think (not about the programming language)
- We have to break the program into a series of steps that the computer can execute

WHAT IS PROGRAMMING

- A computer **program** contains a series of instructions that are sequentially executed
- **Programming** is writing those instructions in a language that the computer can understand
- The order the instructions are executed in is called **Control Flow**

CONTROL FLOW STRUCTURES

Computers read code top to bottom, left to right



Conditionals & Loops alter flow by skipping or repeating lines of code

DETERMINING CONTROL FLOW

- Going straight to coding can be confusing - so we use **Pseudo Code**
- The process of writing Pseudo Code helps us identify:
 - the program steps, and
 - Control Flow Structures that will be required by the program

PSEUDO CODE

(pronounced Soo-doh-kohd)

Pseudo - something that looks like something else,
but isn't quite that thing

Code - a set of words that can
solve a problem on a computer

WHAT IS PSEUDO CODE?

The process of writing a program without using the syntax of a programming language.

- A simple, step-by-step way of writing code in English
- Acts as a guide for writing code (can become comments)
- Great for:
 - Thinking through programming problems
 - Communicating problems to others
 - Collaborating to solve complex problems

HOW TO WRITE PSEUDO CODE?

1. **Look at the problem**
2. **Verbally explain control flow in a set of ordered steps**
(ie. write an algorithm to solve the problem)
3. **Write your steps in Pseudo Code**
(the design for the computer program to follow)
4. **Extract variables**
(useful for translating your solution into code)

HELPFUL GUIDELINES

- One statement per line
- Indent to show hierarchy and structures
- End multi-line structures
- Keep statements language independent (logic plan, not programming)
- (Some people like to) Capitalise initial keyword

Lets look at some Examples...

Sequential Example: The Daily Cost Of Being A Hipster

Algorithm:

1. Get price of coffee
2. Get price of shirt
3. Get price of beer
4. Add cost of items
5. Display result
6. End

Pseudo Code:

1. GET specialty_coffee_price
2. GET plaid_shirt_price
3. GET craft_beer_price
4. daily_cost =
(specialty_coffee_price x 2) +
plaid_shirt_price +
craft_beer_price
5. DISPLAY daily_cost
6. END

Variables:

specialty_coffee_price,
plaid_shirt_price, craft_beer_price ,
daily_cost

Note:

- Three types of instructions:
 - Input (GET)
 - Process/Calc. (=)
 - Output (DISPLAY)
- Operations are numbered

Conditional Example: Ice-Cream

Algorithm:

If person likes ice-cream

 Hi-five them

Otherwise

 Slap them

Pseudo Code:

IF person_likes_icecream = true

 hi_five

ELSE

 slap

END

Variables:

person_likes_icecream, hi_five, slap

Conditional syntaxes:

IF

ELSE

ELSE IF

SWITCH

Loop Example: Dishes

Algorithm:

Get number of dishes
While dishes exist
 Wash a dish
 Decrease dishes by one
End

Pseudo Code:

```
GET number_of_dishes  
WHILE number_of_dishes > 0  
    wash_a_dish  
    decrement number_of_dishes  
END WHILE
```

Variables:

number_of_dishes,
wash_a_dish

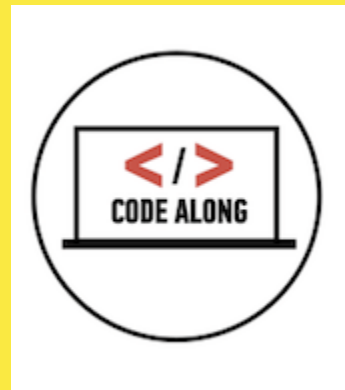
Loop syntaxes:

FOR

WHILE

DO / WHILE

REPEAT, UNTIL



THERMOSTAT

Group Exercise: Thermostat

Write pseudo code for an application that would:

- monitor the room temperature and
- adjust it so the room remains at 22 degrees.

Algorithm:

Pseudo Code:

Variables:

Group Exercise: Thermostat

Algorithm:

Get the temperature

Set target temperature to 22

Repeat these steps:

 Get the current temperature

 If target temperature > (current temperature + 2),

 Then turn on the heater

 If target temperature <= current temperature,

 Then turn off the heater

Pseudo Code:

GET target_temp

target_temp = 22

REPEAT forever

 current_temp = get_sensor_reading

 IF target_temp > (current_temp + 2)

 turn_on_heater

 IF target_temp <= current_temp

 turn_off_heater

Variables:

target_temp

current_temp

get_sensor_reading

turn_on_heater

turn_off_heater



ROCK PAPER SCISSORS

WHAT IS JAVASCRIPT?

HUMAN BODY ANALOGY

html = structure (bones)

css = style (skin/makeup)

javascript

= behaviour

(nervous system - action, reaction, computation, etc)

WHAT CAN JAVASCRIPT DO?

- Add interactivity (eg. responds when user clicks button)
- Dynamically change page contents
- Validate forms (on the client-side)
- Detect the user's browser
- Display information based on the time of the day
- Create Cookies (store info, retrieved next visit)
- And much more...

WHAT IS POWERED BY JS?

Some simple examples:

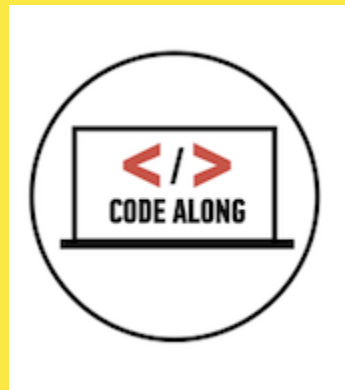
- [JavaScript Introduction](#) via W3Schools
- Website examples
- Turning off JS using browser dev tools

WHERE TO PLACE JS?

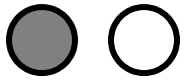
Best Practice: External file, just before `</body>` closing tag

```
<script src="myscript.js"></script>
```

Common practices: [JS where to](#) via W3Schools



COLOR SWITCHER

[HTML](#)[CSS](#)[JS](#)[Result](#)[Edit on](#)  [DEPEN](#)

Color Scheme Switcher

Try clicking on one of the colors above to change the colors on this page!



TRAFFIC LIGHT

HTML

CSS

JS

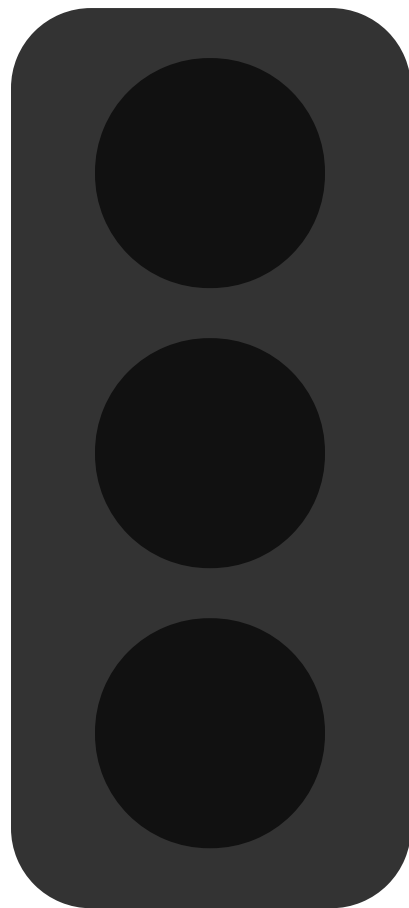
Result

Edit on  CODEPEN

Stop

Slow

Go



REVIEW: LEARNING OBJECTIVES

- What is programming?
- Program Control Flow
- Read and write Pseudo Code
- What is JavaScript?
- Read and write JavaScript

HOMEWORK

RESOURCES

- [Mozilla's MDN for Javascript](#)
- [Mozilla's MDN JS Tutorial](#)
- [Chrome DevTools Overview](#)
- [What is JavaScript \(video\)](#) via Code School
- [Learn JavaScript](#) via Codecademy