

Assignment 1: Concept of Programming

In this assignment, you will practise some basic concepts of programming using JavaScript. You will write simple programs that perform various tasks such as printing messages, performing calculations, using variables and methods, and working with operators.

Learning Outcomes

- Understand what is programming and the different types of programming languages
- Use basic building blocks of programming such as variables, methods and operators
- Write simple Java programs to perform arithmetic operations and print outputs
- Use multiple classes and objects to calculate the area and circumference of shapes
- Use ASCII values to represent characters
- Use loops to generate the Fibonacci series

Instructions

- Write your code in a text editor like Notepad or Visual Studio Code.
- Save your file with a .js extension (for example, assignment1.js).
- You can use a web browser such as Chrome or Firefox to run your code. Open the browser's developer tools (Ctrl+Shift+I) and go to the console tab. Then drag and drop your file into the browser window or use the File > Open File option to select your file. You should see the output of your code in the console.
- Alternatively, you can use an online tool such as <https://replit.com/languages/javascript> to write and run your code.
- For each question, write a comment with the question number and description before writing your code. For example:

Questions

Q1. Print Hello World

Write a JavaScript program that prints "Hello World" on the console.

Q2. Add two numbers/binary numbers/characters

Write a JavaScript program that takes two numbers/binary numbers/characters as input from the user (using prompt) and prints their sum on the console.

Q3. Calculate compound interest

Write a JavaScript program that takes the principal amount, rate of interest and number of years as input from the user and calculates the compound interest using the formula:

$$CI = P * (1 + R/100) ^ N$$

where CI is the compound interest, P is the principal amount, R is the rate of interest and N is the number of years.

Q4. Calculate the power of a number

Write a JavaScript program that takes a base number and an exponent as input from the user and calculates the power using a loop.

Q5. Swap two numbers

Write a JavaScript program that takes two numbers as input from the user and swaps their values using a third variable.

Q6. Calculate the area of a rectangle

Write a JavaScript program that takes the length and width of a rectangle as input from the user and calculates its area using the formula:

$\text{Area} = \text{Length} * \text{Width}$

Q7. Calculate the area and circumference of a circle

Write a JavaScript program that calculates the area and circumference of a circle. Two methods: `getArea()` and `getCircumference()` that return the area and circumference respectively using these formulas:

$\text{Area} = \text{PI} * \text{radius} * \text{radius}$

$\text{Circumference} = 2 * \text{PI} * \text{radius}$

Q8. JavaScript program to find the ASCII value of a character

Write a JavaScript program that takes a character as input from the user (using `prompt`) and prints its ASCII value on the console (using `type.charCodeAt`).

Q9. Check if a number is odd or even

Write a JavaScript program to check if a given number given by the user is even or odd.

Q10. Swap two variables without using a third variable

Write another way to swap two variables without using a third variable in javascript

Hint: use arithmetic operators

Q11. Print Fibonacci series till n

Write a javascript program that takes n as input from the user (using `prompt`) and prints the Fibonacci series till n on the console

The Fibonacci series is a sequence where each term is the sum previous two terms

Example: 0 1 1 2 3 5 8 ...

Appendix

Setting up the programming environment

- To write and run JavaScript code, you will need two things: a text editor and a JavaScript engine.
- A text editor is a software that lets you write and edit code. There are many text editors available, but we will use Visual Studio Code (VSCode) for this course. VSCode is a free, open-source, and powerful editor that supports many languages and features.
- A JavaScript engine is a software that executes JavaScript code. There are many JavaScript engines available, such as Chrome's V8, Firefox's SpiderMonkey, or Node.js. We will use Node.js for this course. Node.js is a runtime environment that lets you run JavaScript code outside of a web browser.

How to install VSCode

- To install VSCode on your computer, follow these steps:
 - Go to <https://code.visualstudio.com/> and download the installer for your operating system (Windows, Mac OS X, or Linux).
 - Run the installer and follow the instructions on the screen.
 - Once installed, launch VSCode from your start menu or applications folder.

How to install Node.js

- To install Node.js on your computer, follow these steps:
 - Go to <https://nodejs.org/en/> and download the installer for your operating system (Windows, Mac OS X, or Linux).
 - Run the installer and follow the instructions on the screen.
 - Once installed, open a terminal or command prompt window and type `node -v` to check if Node.js is installed correctly. You should see something like `v14.18.1` which is the version number of Node.js.

How to write and run JavaScript code in VSCode

- To write and run JavaScript code in VSCode, follow these steps:
 - Create a new folder on your computer where you want to store your code files.
 - Open VSCode and go to File > Open Folder... and select the folder you created.
 - In VSCode, click on the New File icon in the Explorer pane (or press Ctrl+N) and create a file named `hello.js`.
 - In `hello.js`, type `console.log("Hello World");` which is a simple JavaScript statement that prints "Hello World" to the console.
 - To run `hello.js`, right-click on it in the Explorer pane and select Open in Integrated Terminal (or press Ctrl+Shift+C). This will open a terminal window inside VSCode where you can run commands.

- In the terminal window, type `node hello.js` which will execute your code using Node.js. You should see "Hello World" printed in the terminal.

Congratulations! You have successfully set up your programming environment for JavaScript using VSCode and Node.js!