

# Special Topics in Design I

## DSL 810

### Topic 3

### Programming

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# Programming Basics

- Programming – instruction to perform task
- English or Hindi – grammar, similarly programming languages have syntax
- How would a calculator add two numbers?

# Algorithm for adding two numbers

- Input number 1
- Input number 2
- Add number1 and number 2
- Print the result.
- Example
- [https://www.onlinegdb.com/online\\_c\\_compiler](https://www.onlinegdb.com/online_c_compiler)

# Sum two numbers

- Sum two numbers
- Sum two numbers with input and output
- Sum two numbers with if else
- Sum n numbers with for loop
- Sum n numbers with a function

# Introduction to programming in C

- [https://www.onlinegdb.com/online\\_c\\_compiler](https://www.onlinegdb.com/online_c_compiler)
- [http://learn.onlinegdb.com/learn\\_c\\_programming](http://learn.onlinegdb.com/learn_c_programming)
- [http://learn.onlinegdb.com/c\\_program\\_examples](http://learn.onlinegdb.com/c_program_examples)

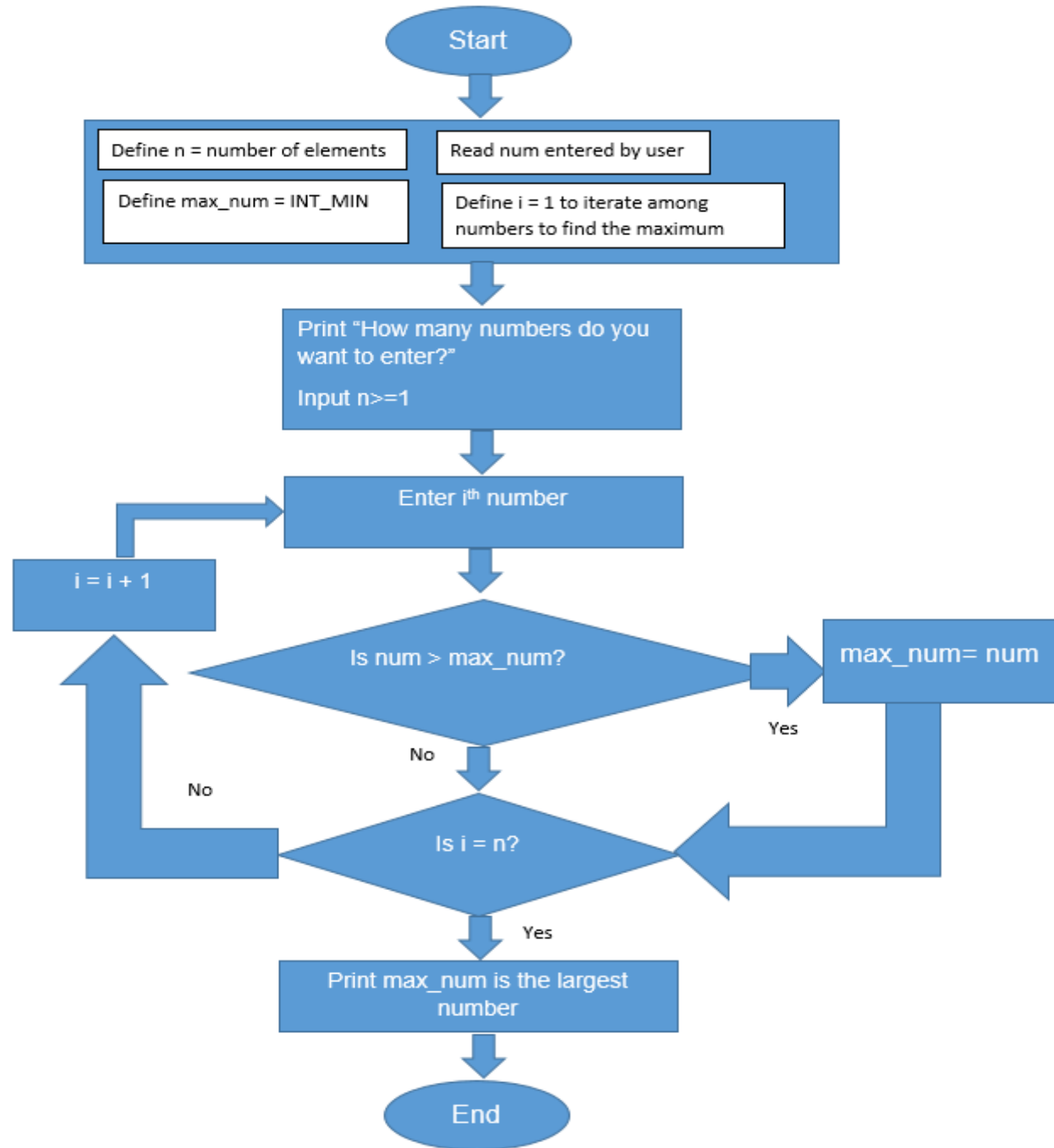
# C programming examples

- char  
([http://learn.onlinegdb.com/c program check entered character vowel consonants](http://learn.onlinegdb.com/c_program_check_entered_character_vowel_consonants))
- logical and arithmetic operators  
([http://learn.onlinegdb.com/c program count vowels consonants digits special characters in string](http://learn.onlinegdb.com/c_program_count_vowels_consonants_digits_special_characters_in_string))
- find maximum of a set of numbers  
([http://learn.onlinegdb.com/c program find maximum numbers from entered numbers](http://learn.onlinegdb.com/c_program_find_maximum_numbers_from_entered_numbers))

# Flowchart

## Flowchart for Largest number

Languages have different syntax but are largely similar. Learn one language and you can learn others quickly. Flowchart/Algorithm is the key.



# Python

- [Tutorial](#) from Sanju on Python basics
- [https://www.onlinegdb.com/online\\_python\\_interpreter](https://www.onlinegdb.com/online_python_interpreter)
- <https://www.geeksforgeeks.org/python-program-to-add-two-numbers/>
- [Fab Academy tutorial on python](#)
- Raspberry Pi



# Basic elements of programming language

- Programming Environment
- Data Types
- Variables
- Keywords
- Logical and Arithmetical Operators
- If else conditions
- Loops
- Numbers, Characters and Arrays
- Functions
- Input and Output Operations
- Comments
- Indentation
- Bottom up debugging

Programming Language	Application
C	OS, Languages, Microcontroller/ Embedded programming, Efficient at runtime. Python vs. C 95% embedded programming in C.
Python	One of the best to teach programming, GUI, Web applications, Scientific computations, Raspberry Pi. Efficient in development times.
Javascript	Creating web pages. Run in browsers. HTML+CSS+Javascript
Scratch	Graphical language, flowchart based for children. MIT App Inventor related to it.
Processing	GUI for Arduino
Visual Basic	Windows based, Event based programming, Easy to build GUI, VBA in Excel.
.NET	Software framework from Microsoft

# Scratch

- <https://scratch.mit.edu/>
- <https://scratch.mit.edu/projects/323164112/editor>
- [Arduino with Scratch](#)

# Javascript

- <https://www.w3schools.com/js/>
- Current Date and Time  
[https://www.w3schools.com/js/tryit.asp?filename=tryjs\\_myfirst](https://www.w3schools.com/js/tryit.asp?filename=tryjs_myfirst)
- Image change  
[https://www.w3schools.com/js/tryit.asp?filename=tryjs\\_intro\\_lightbulb](https://www.w3schools.com/js/tryit.asp?filename=tryjs_intro_lightbulb)
- [http://web.iitd.ac.in/~jay/javascript/js\\_example1.html](http://web.iitd.ac.in/~jay/javascript/js_example1.html)

# Games in Javascript

- <http://web.iitd.ac.in/~jay/javascript/tic-tac-toe/>
- <https://superdevresources.com/open-source-html5-games/>
- <http://web.iitd.ac.in/~jay/javascript/pacman-canvas-master/>

# Assignment 3

- Please document your learnings about programming, especially in C and Python. Talk about what you have learnt about the different elements and aspects of programming in these languages, some examples that you have worked on your own.