



# Introduction to Programming with Python

By: Iman Khani Jazani

- *Senior Data Scientist, Adin*
- *Technical AI Product Manager and Advisor, Mehra*
- *AI and Data Specialist, AiHum*
- *Adjunct Professor, Sharif University of Technology*



# Last lecture

- Review the Last Lecture
- History of Computation and Computers
- Component of a Computer System
- Type of Programs in Computers
- Algorithm: Programs Brain
- **Application of Programming in the Digital Age!**



# Today

- Short Presentations
- Review the Last Lecture
- Primitive Instructions
- Python Programming Language
- **Application of Programming in the Digital Age!**



Together

Send your feedback about the  
class whenever you want!



## Contact me

- Gmail: [ImanKhaniJazani@gmail.com](mailto:ImanKhaniJazani@gmail.com)
- LinkedIn: <https://www.linkedin.com/in/ImanKhaniJazani/>
- Telegram: [@IKJ1992](https://t.me/IKJ1992)





## Main links for our class

از 5 اسفند گروه خصوصی  
میشود!

- Telegram group: [t.me/SharifPythonSpace1401](https://t.me/SharifPythonSpace1401)
- GitHub organization: [github.com/SharifPythonSpace](https://github.com/SharifPythonSpace)





# Grading

راه جبران هم تحت شرایطی  
وجود داره!

- Approx. 25% Programming Assignments (judgment with Quera)
- Approx. 14% Mid-term Project (alone, judgment with TAs and Quera)
- Approx. 37% Final Project (team work~5 member, judgment with TAs and Quera)
  - *Proposal (about real needs)*
  - *Coding*
  - *Release*
- Approx. 30% Final Exam (algorithm-based paper exam)
- Approx. 5% Presentation with Code(extra score , for the next week lecture, only for the first two person)
- Approx. 2% Challenging Questions and Contributions in Class (extra score)
- Approx. 7% long presentation (extra score)



# Time for TA class!

- Check our Telegram group!



# Short Presentations



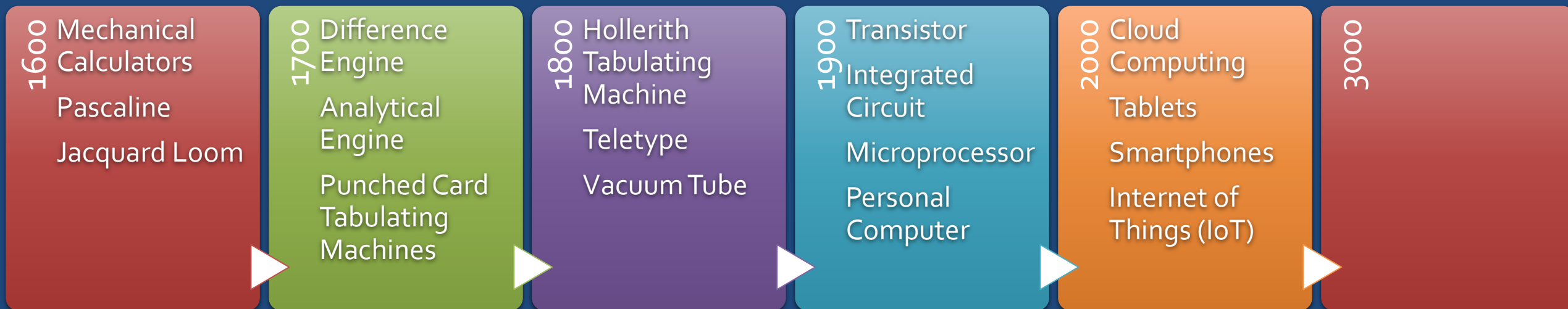
# What is flowchart? What is better than a flowchart?

Who is volunteer for the short presentation?

# Review the Last Lecture



# Computing timeline





# How to convert a problem to machine language?

Needs analysis

Well-defined problem definition

Write an algorithm in a paper or your brain!

Select a suitable programming language

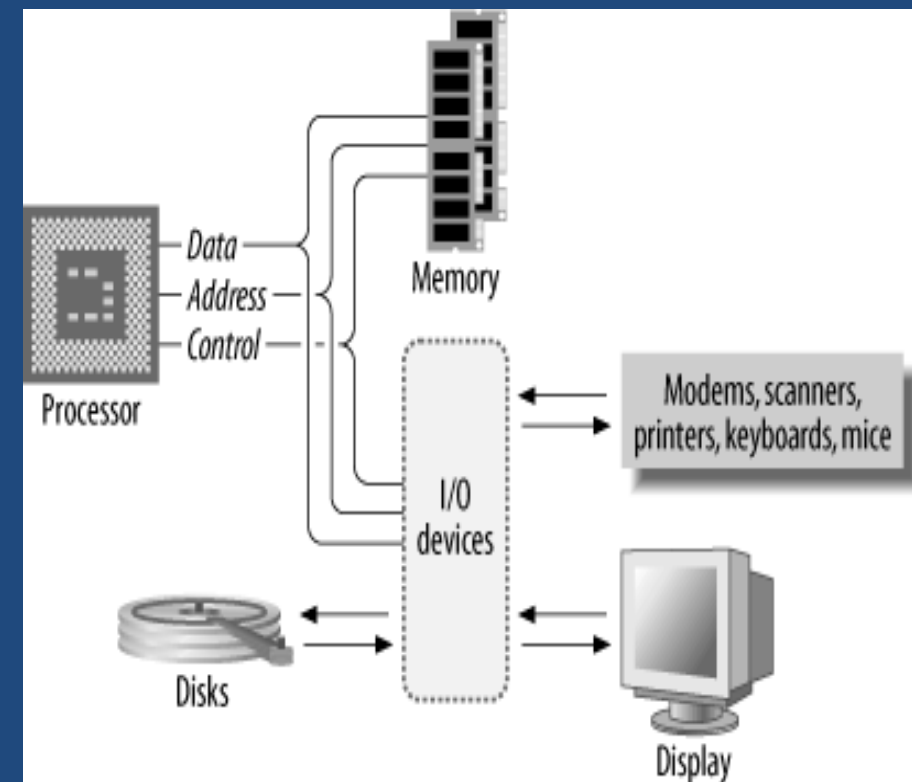
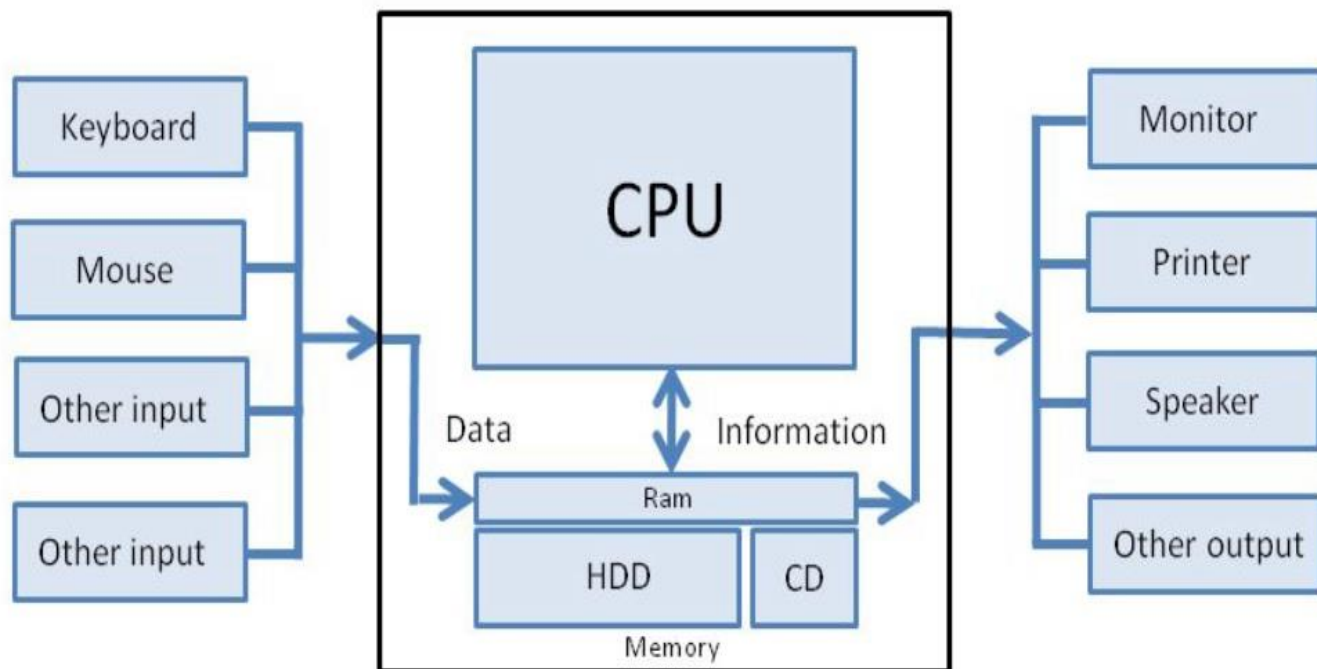
Write a program

Run compiler or interpreter

...



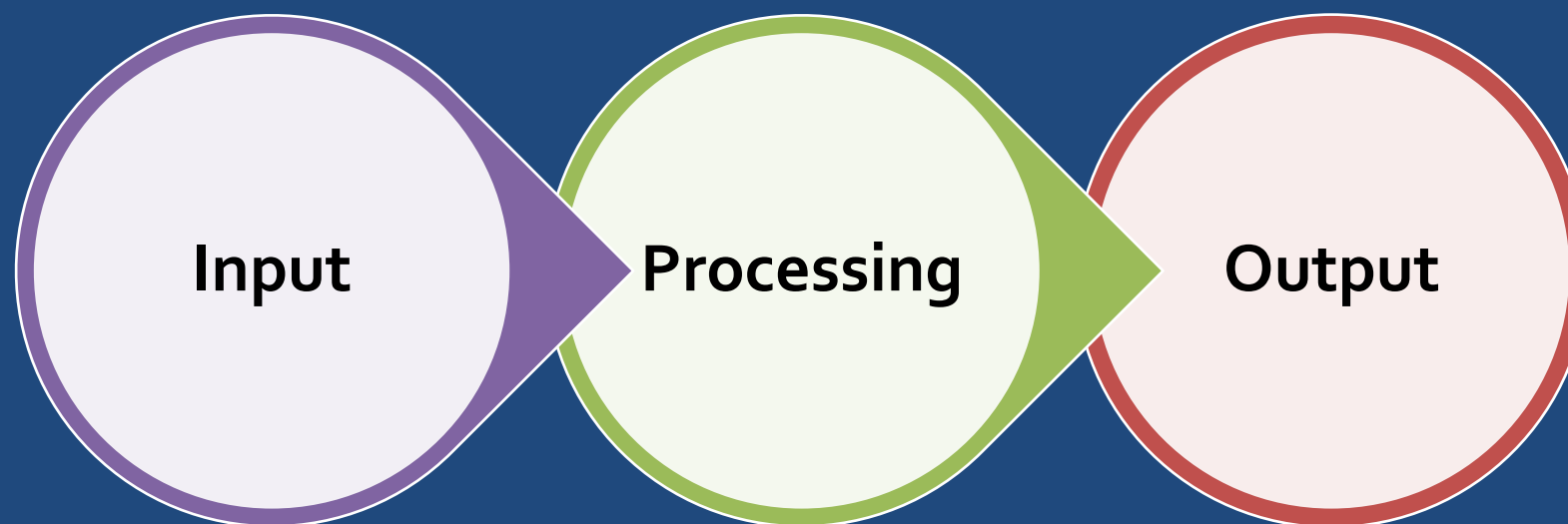
# Communications!





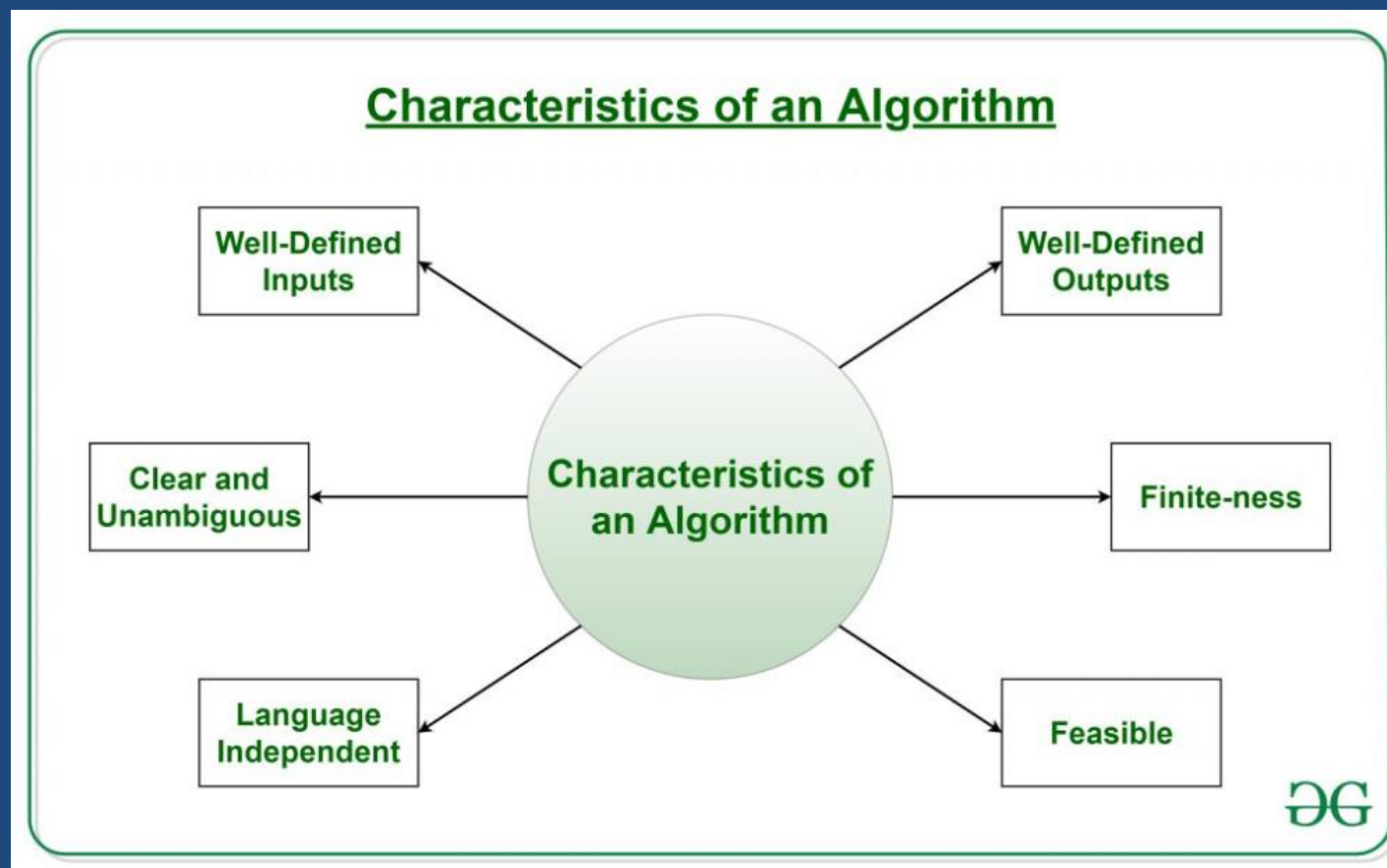
# What is computer in general?

- A computer is a complex and modular system (in its hardware and software) for problem solving, computing, and data processing in different domains.





# The characteristics of Algorithm!

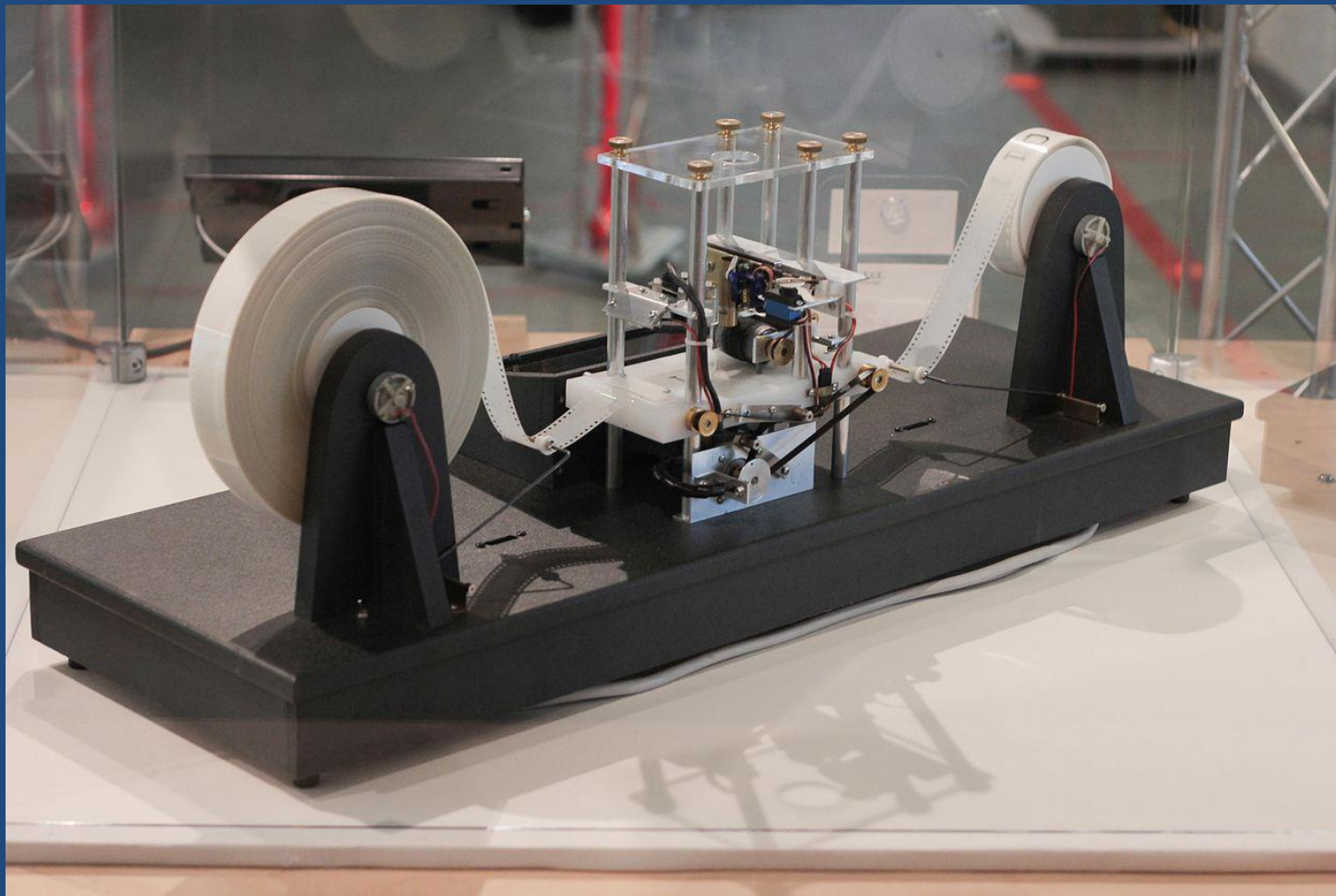




# Primitive Instructions



# Turing Machine





# Building block of languages

- Today programming languages have more convenient set of primitives.
- We can create new primitives.
- Anything computable in one language is computable/ transformable in/to another languages.



# We have six core (primitive) instructions. What are these and WHY are these?

Who is volunteer for the short presentation?



# Going into bigger and more complex

- Set of **primitive instructions** are provided by programming languages.
- Legal (valid) combination of primitives makes **expressions**.
- You can interpret an expression and compute its value.

# Language Structure



# Level of processing in a language!

- Word-level (primitives)
- Syntax
- Semantic
- Discourse (valid result)



# Level of errors in a language!

- Word-level (primitives) error
- Syntax error
- Semantic error
- Discourse (valid result) error





# Every things have a language!?

Genes

Humans

Computer

Mechanical  
device

Trees

Animals

Algorithms

Programming  
(formal)

...

# Python Programming Language



# Flowchart



One step in the process. The step is written inside the box. Usually, only one arrow goes out of the box.



Direction of flow from one step or decision to another.



Decision based on a question. The question is written in the diamond. More than one arrow goes out of the diamond, each one showing the direction the process takes for a given answer to the question. (Often the answers are "yes" and "no.")



Delay or wait



Link to another page or another flowchart. The same symbol on the other page indicates that the flow continues there.



Input or output



Document

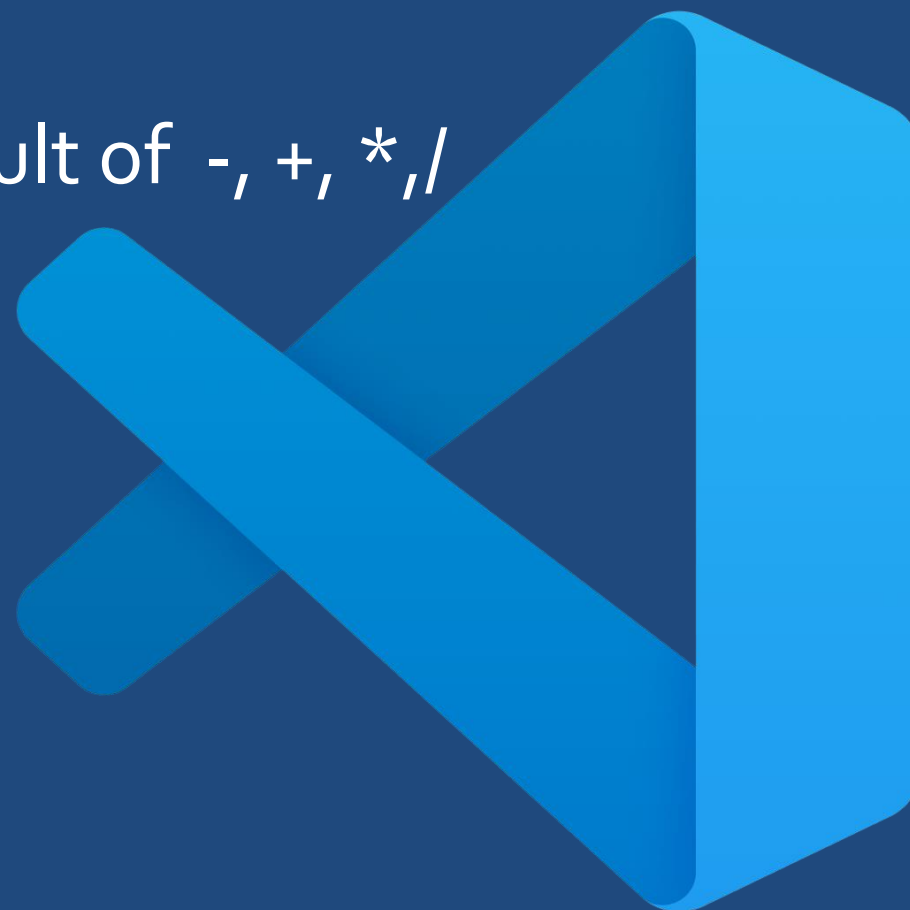


Alternate symbols for start and end points



# Simple Calculator

- Input: two numbers
- Output: calculate the result of  $-$ ,  $+$ ,  $*$ ,  $/$





# Find dictionary of a text

- Input: text
- Output: some statistics (count)



# Application of Programming in the Digital Age!



# AgTech...

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## Drones in Agriculture

Drones are increasing productivity and crop yield in the agricultural industry. From real-time data to healthier plants, UAS are literally growing more plants.



# Lecture Resources

- <https://asq.org/quality-resources/flowchart#:~:text=A%20flowchart%20is%20a%20picture,process%2C%20or%20a%20project%20plan.>