Concepts of Programming

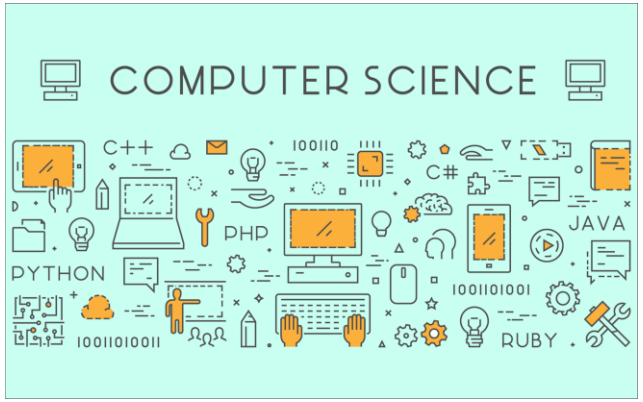
Ashutosh Jha,
Technical Officer,
C-DAC Patna

Agenda

- Computer Science
- Programming
- Importance of Programming in Computer Science
- Application of Programming in Various Industries
- Setting up your development environment
- Instructions
- Programming Languages
- Types of Programming Languages
- Compilers
- Interpreters
- Algorithms
- Building a Program

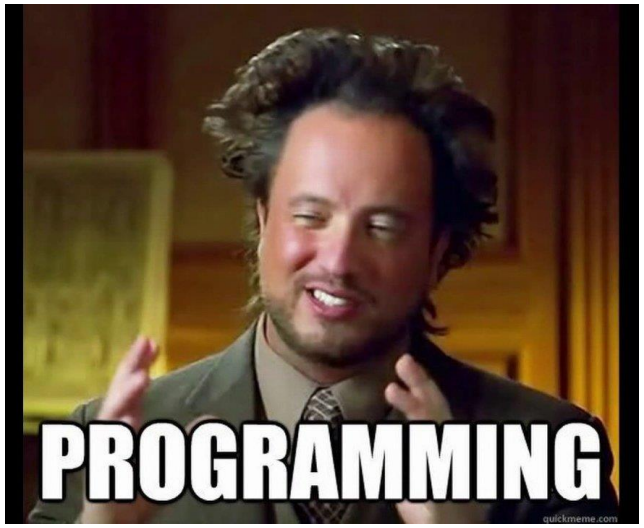
Computer Science

- Computer science is the study of computers and computing technologies
- It encompasses a wide range of topics such as programming, software development, artificial intelligence, computer networks, and more
- Computer science is a rapidly growing field with applications in many industries



Programming

- A coded sequence of instructions to be carried out by the computer
- Programming is the process of designing, writing, testing, and maintaining computer programs
- It involves creating sets of instructions that a computer can understand and execute
- Programs can be written in various programming languages such as Java, Python, C++, and more



Importance of Programming in Computer Science

- Programming is an essential component of computer science
- It enables us to develop software applications, build websites, analyze data, and solve complex problems
- With the increasing demand for technology, programming skills have become increasingly valuable in today's job market

Application of Programming in Various Industries

- Programming has applications in many different industries, including:
  - Healthcare: for managing patient records and medical research
  - Finance: for managing financial transactions and analyzing market trends
  - Education: for creating educational software and online learning platforms
  - Entertainment: for developing video games, animation, and special effects
- The possibilities are endless with programming, and it can be used to solve a wide range of problems in various fields

Setting Up Your Development Environment

- Download and install VSCode
- Install the JavaScript extension in VSCode
- Download and install Node.js
- Create a new JavaScript file in VSCode
- Use the integrated terminal within VSCode to run your code
- An IDE, or Integrated Development Environment, is a software application that provides comprehensive facilities for programming and software development.
- Some popular examples of IDEs include Visual Studio, Eclipse, and IntelliJ IDEA.

Instructions

- Instructions tell the computer what to do in a programming language.
- Programs are made up of a series of instructions.
- Proper syntax and structure are important for instructions to work.
- Errors can occur if instructions are not written correctly.
- Debugging helps identify and fix errors.

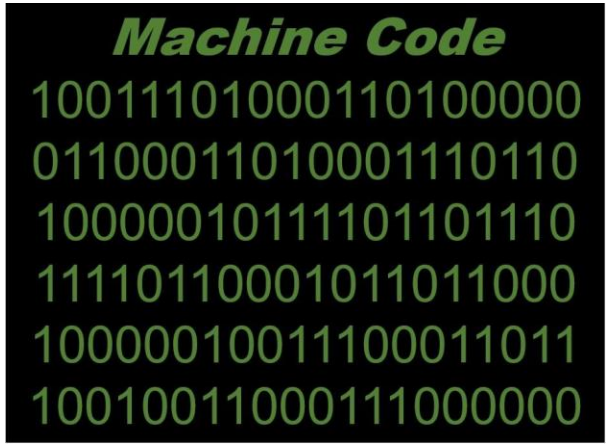
trying to listen to instructions be like

Programming Language

- Programming languages are languages used to write software programs.
- Each programming language has its own syntax and structure.
- Some popular programming languages include Java, Python, JavaScript, C++, and Ruby.
- The choice of programming language depends on the project requirements and developer preference.
- Learning multiple programming languages can help expand one's skill set and career opportunities.

Types of Programming Language

- Programming languages can be categorized into two types: high-level and low-level.
- High-level languages are closer to natural language and are easier to read and write. Examples include Java, Python, and JavaScript.
- Low-level languages are closer to machine language and are more difficult to read and write. Examples include Assembly and Machine Code.
- Each type of programming language has its own advantages and disadvantages and is used for different purposes.




```
begin
PAUSE
MOV Rsw Rsrc1
MOV Rsw R7seg
PAUSE
MOV Rsw Rsrc2
MOV Rsw R7seg
ADD
PAUSE
MOV Rdest R7seg
end
```

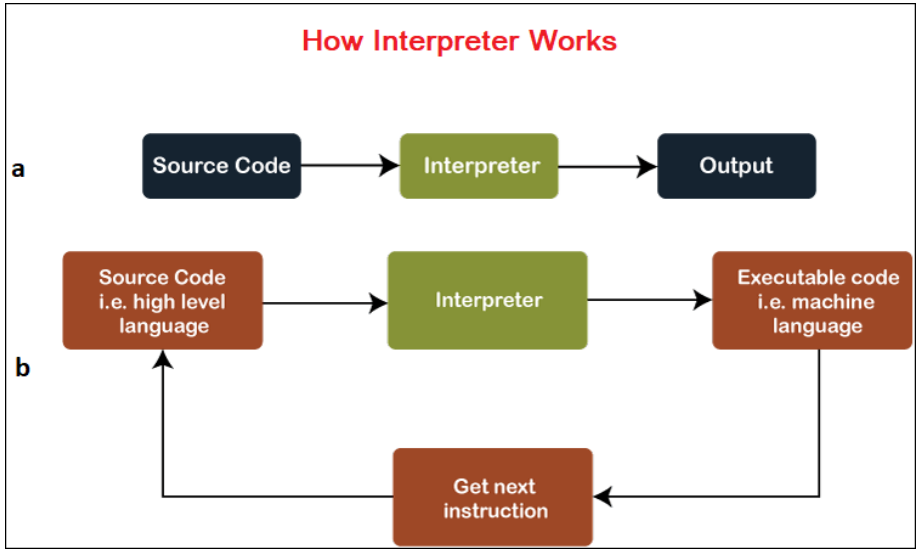
```
0000
F000
0079
0078
F000
007A
0078
1100
F000
00B8
```

Compiler

- A compiler is a software program that translates source code into machine code.
- Compilers are used to create standalone executable programs from source code.
- Compilation is a one-time process that converts the entire source code into machine code.
- Compiled programs generally run faster than interpreted programs.
- Some popular compilers include GCC, Clang, and Microsoft Visual C++.

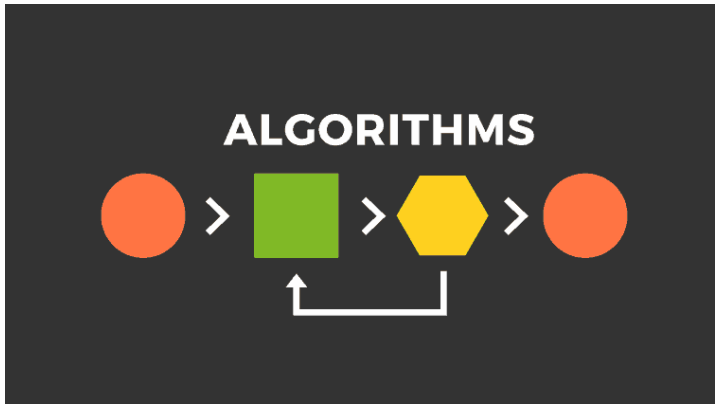
Interpreter

- An interpreter is a software program that reads and executes code line by line.
- Interpreters are used to execute code without first translating it into machine code.
- Interpretation is a continuous process that executes the code as it is read.
- Interpreted programs are generally slower than compiled programs.
- Some popular interpreters include Python, Ruby, and PHP.



Algorithms

- An algorithm is a sequence of precise instructions that, once performed, will complete a specific task.
- Algorithms are used to solve problems in computing, but they're also frequently used to describe sequences of instructions in the non-digital world.
- Typical algorithms that you might see in the non-digital world are:
  - Instructions for brushing your teeth
  - Following a recipe to bake a cake
- Algorithms written in a programming language are computer programs, or parts of computer programs.



Building a Program

- Identify the problem you want to solve.
- Plan out the program's structure and logic.
- Choose a programming language and editor.
- Write the code, following proper syntax and structure.
- Test the program for errors.
- Refine the program's logic and structure as needed.
- Writing a program requires careful planning and attention to detail. Following these steps can help ensure a successful program.

Recap

- Today we discussed the basics of programming and computer science
- Introduction to Computer Science and Programming
- Importance of Programming in Computer Science and its Applications in Various Industries
- Setting up Your Development Environment and Basic Instructions
- Overview of Programming Languages, Types of Programming Languages, Compilers, and Interpreters
- Understanding Algorithms and Building a Program

Coming UP...

- In our next session, we will discuss variables, methods and operators and writing your first program
- Be sure to come prepared with your computer and a text editor or integrated development environment (IDE) of your choice.

Questions

Thank You!!!

https://www.linkedin.com/company/c-dac-patna

https://twitter.com/CDAC_Patna

https://www.facebook.com/PatnaCDAC/

https://www.youtube.com/c/CDACPatna