CEC MOOC
PROGRAMMING IN PYTHON

TOPIC: Using Computer as a Problem-Solving Tool

WEEK-1 LECTURE-2

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Problem-solving

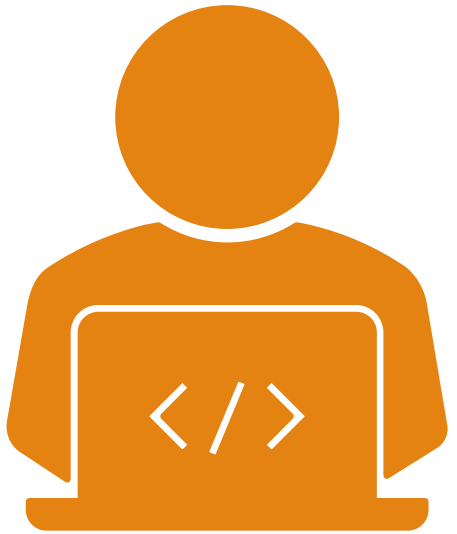
Understanding and describing the problem correctly is the first step towards problem-solving.

Then, utilising our past understanding of the problem domain and the most effective method for resolving that specific problem, we attempt to transform the problem into a solution.

Programming

Programming is an activity to solve a problem using computer.

A program comprises a set of instruction provided to the computer to solve a particular problem.



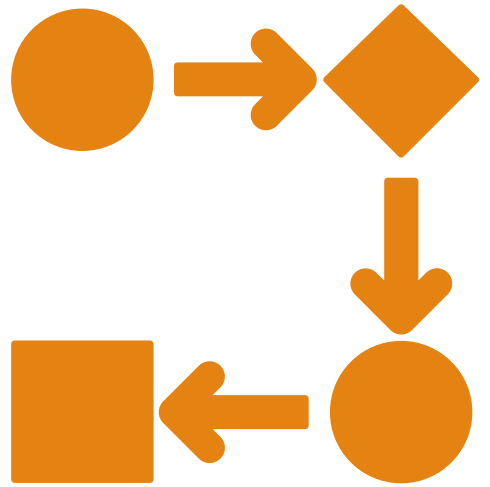
When we utilise a computer to solve a problem, it will solve the problem much more quickly.

The steps below are involved when using a computer as a problem-solving tool.

- Defining & Analysing the problem
- Writing Codes
- Compilation and Execution
- Debugging and Testing
- Documentation

Defining & Analysing the problem

A well-defined problem statement is the first step towards solving a problem with the computer. Therefore, we need to define the problem well before we can use a computer program to solve it. So, a computational problem may consist of many layers along with the solution to each layer.



Next, we need to analyse the problem. For the analysis, it is vital to explore the following regarding the problem:

- What will be the input?
- What kind of output is needed.
- Any specific conditions.
- Finally, the process that will convert the input to the desired output.

Example

For example, if the problem is to add two integers, input will be two positive integers; the process will add both, and the output will be the sum of both the integers.

Writing Codes

The codes, also referred to as the source code, are written in a specific programming language. Before writing the code, one must use the tools such as an algorithm, flowchart, etc., to depict the program's logic.

Compilation and Execution

The compilation process converts the source code written using a programming language to machine-readable or executable format. This process is also called compilation. The .exe file provided by the compiler runs and produces the output.

Debugging and Testing

The source code written using a programming language may have errors which will not allow the source code to compile. These errors can be a syntax error or logical error.

These errors, referred to as bugs, needs to be corrected, and this process of correction is debugging. Debugging involves checking the program to see if the desired output is obtained or not.

Testing, then, is the act of verifying a program's right functionality by running it with some input data and looking at the results.

Documentation

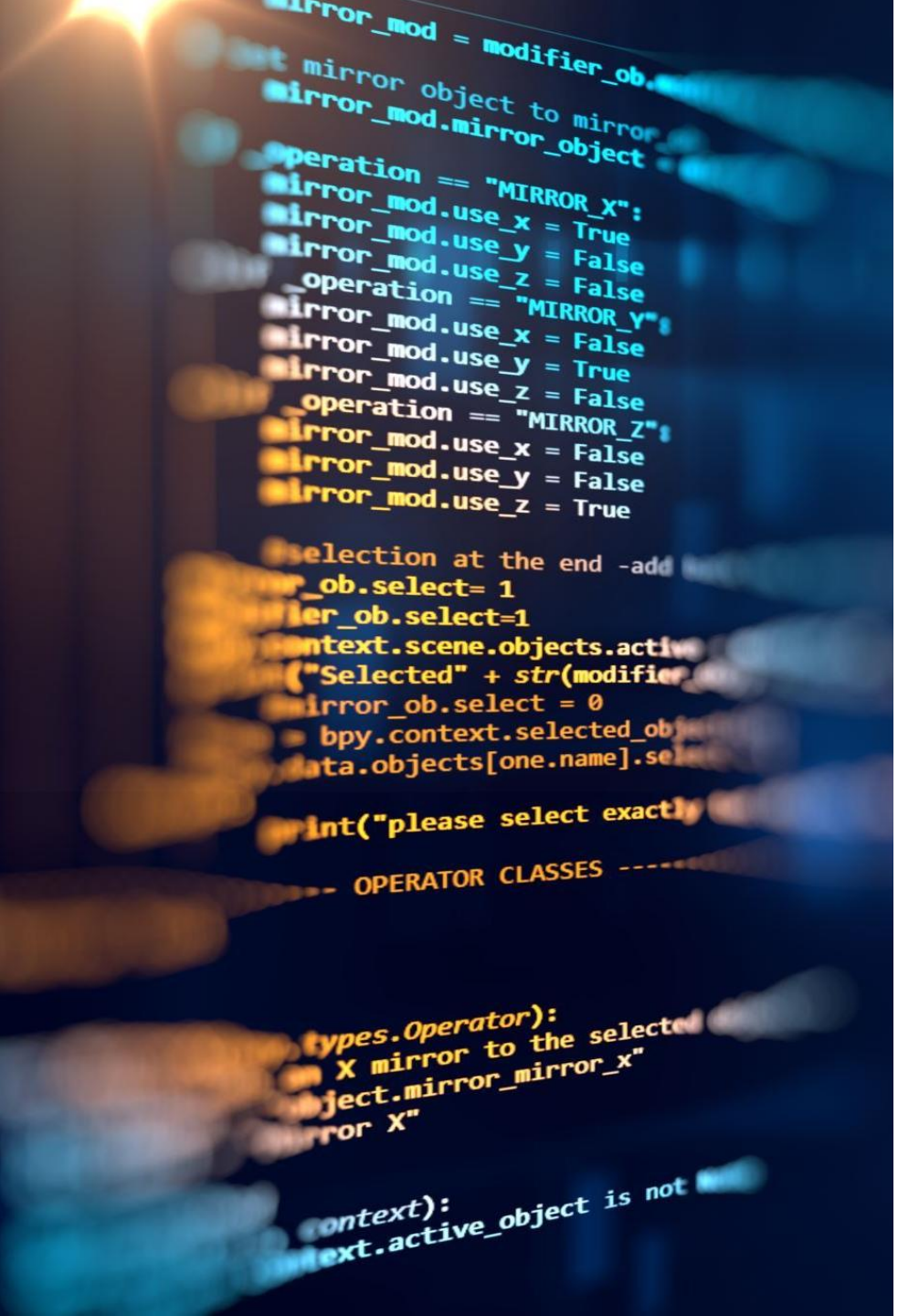
Documentation of all the task from the beginning of the problem solving to its end is essential for future reference.

Documentation can be subcategorised into two parts:

- Technical Document
- The Manual

Technical Document

A technical document covers everything from problem analysis to the implementation details of the program. Any changes or updates to the program in future will need this document as a reference.



User Manual

A user manual is a document created for the end user of a program and it guides the user through the operations of the program.

Books and References

Sprankle, M. and Hubbard, J., 2012. *Problem solving & programming concepts*. Boston: Prentice Hall.

https://ncert.nic.in/textbook/pdf/kecs104.pdf

Thank You