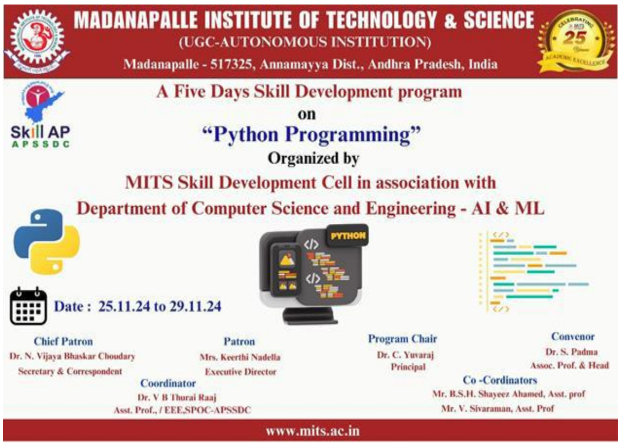
A Report on Five-days Skill Development Program on "Python Programming" Organized by MITS Skill Development Cell in association with Department of CSE – AI & ML from 25.11.2024 to 29.11.2024



MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(UGC-AUTONOMOUS INSTITUTION)
Madanapalle - 517325, Annamayya Dist., Andhra Pradesh, India

A Five Days Skill Development program
on
"Python Programming"
Organized by
MITS Skill Development Cell in association with
Department of Computer Science and Engineering - AI & ML

Date : 25.11.24 to 29.11.24

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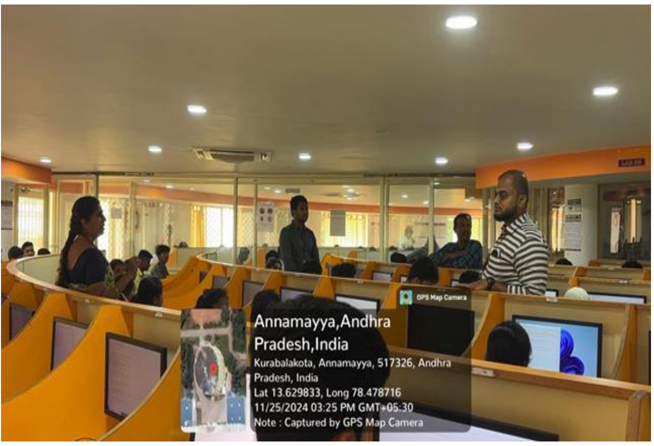

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Report Submitted by: Mr. BSH. Shayeez Ahamed, Assistant Professor, Department of CSE – AI & ML.
Participants: II Year CSE – AI & ML – 71 Students.
Mode of Conduct: Offline
Report Received on 03.12.2024.

MITS Skill Development cell in association with Department of Computer Science & Engineering – AI & ML has organized a five days skill development program on ***"Python Programming"*** from **25.11.2024 to 29.11.2024.**

Welcome Address:

The event commenced at 10:00 AM with a warm and engaging welcome address to all by Mr. BSH. Shayeez Ahamed, Asst. Professor, Department of CSE – AI & ML, Madanapalle Institute of Technology & Science **(**MITS), Madanapalle.

Keynote Address:

Dr. S. Padma, Associate Professor & Head, Department of CSE – AI & ML, Madanapalle Institute of Technology & Science **(**MITS), Madanapalle welcomed the student with her keynote address and appreciated the students for attending the session. She also requested every student to come with innovative ideas by learning the new technologies to meet the current technologies. Further, she motivated the students to enrich themselves.

Resource Person Lecture:

Dr. S. Padma, Assoc. Professor & Head, Dept. of CSE – AI & ML, MITS, Madanapalle explained about the Python programming and its functioning.

Day – 1 (25.11.2024): (Basics of Programming)

She shared the following points in the presentation

What is a Program?

- A program is a piece of code or set of instructions that tells a computer how to perform a task.
- To use an analogy, a program is like a computer's recipe.
- It contains a list of ingredients (called variables, which can represent numeric data, text, or images) and a list of directions (called statements) that tell the computer how to execute a specific task.

Types of Programming Language:

Low-Level Programming Language

- Low-level language is machine-dependent (0s and 1s) programming language. The processor runs low-level programs directly without the need of a compiler or interpreter, so the programs written in low-level language can be run very fast.

Middle-level programming language

- Middle-level programming language lies between the low-level programming language and high-level programming language. It is also known as the intermediate programming language and pseudo-language.

High-level programming language

- High-level programming language (HLL) is designed for developing user-friendly software programs and websites. This programming language requires a compiler or interpreter to translate the program into machine language (execute the program). The main advantage of a high-level language is that it is easy to read, write, and maintain.

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Front-end vs. Back-end Languages

- Front-end languages are called client-side languages, which are used to create virtual and interactive website elements that users can see. The front-end languages include HTML, CSS and JavaScript. Backend languages are known as server-side languages. They create logic and functionality behind the scenes of the website, like processing, storing and managing the user's account and authentication. Python, Ruby, and Java are some of the backend languages.

Algorithms:

- An algorithm is a set of Instructions for solving logical & mathematical problems for completing a task.

Characteristics of an Algorithm

An algorithm must possess following characteristics:

- **Finiteness:** An algorithm should have finite number of steps and it should end after a finite time.
- **Input:** An algorithm may have many inputs or no inputs at all.
- **Output:** It should result at least one output.
- **Definiteness:** Each step must be clear, well-defined and accurate. There should not be any ambiguity.
- **Effectiveness:** Each step must be simple and should take a finite amount of time.

Following guidelines must be followed while developing an algorithm:

- An algorithm will be enclosed by START (or BEGIN) and STOP (or END).
- To accept data from user, generally used statements are INPUT, READ, GET or OBTAIN.
- To display result or any message, generally used statements are PRINT, DISPLAY, or WRITE.
- Generally, COMPUTE or CALCULATE is used while describing mathematical expressions and based on situation relevant operators can be used.

Designing an algorithm has following advantages:

- **Effective Communication:** Since algorithm is written in English like language, it is simple to understand step-by-step solution of the problems.
- **Easy Debugging:** Well-designed algorithm makes debugging easy so that we can identify logical error in the program.
- **Easy an Efficient Coding:** An algorithm acts as a blueprint of a program and helps during program development.
- **Independent of Programming Language:** An algorithm is independent of programming languages and can be easily coded using any high-level language.

Flowchart:

- A flowchart can also be defined as a diagrammatic representation of an algorithm, a step-by-step approach to solving a task.

Benefits of flowcharts:

- **Communication:** Flowcharts are better way of communicating the logic of a system to all concerned.
- **Effective analysis:** With the help of flowchart, problem can be analysed in more effective way.
- **Proper documentation:** Program flowcharts serve as a good program documentation, which is needed for various purposes.
- **Efficient Coding:** The flowcharts act as a guide or blueprint during the systems analysis and program development phase.
- **Proper Debugging:** The flowchart helps in debugging process.
- **Efficient Program Maintenance:** The maintenance of operating program becomes easy with the help of flowchart. It helps the programmer to put efforts more efficiently on that part.

Day – 2 (26.11.2024): (Python Features & Data Types)

Features of Python Programming:

- **High Level:** Python is high level language because it uses English like statements and also python is interpreted language.
- **Object oriented:** Object oriented technology is a methodology of the development of software which is very efficient compare to structured programming methodology.
- **Platform Independent:** Python is Platform Independent language, the combination of hardware and operating system is called platform.
- **Dynamic:** Python is a dynamic language. Any activity is said to be dynamic when it is happening during execution.
- **Slow:** Python is slow because it is interpreter but the python code is executed faster by writing efficient code which exploits the environment.
- **Easy to code:** Python is a high-level programming language. Python is very easy to learn the language as compared to other languages like C, C#, Javascript, Java, etc.
- **Free and Open Source:** Python language is freely available at the official website and you can download it from the given download link below click on the Download Python keyword.
- **GUI Programming Support:** Graphical User interfaces can be made using a module such as PyQt5, PyQt4, wxPython, or Tk in python.
- **Extensible feature:** Python is a Extensible language. We can write us some Python code into C or C++ language and also, we can compile that code in C/C++ language.
- **Python is Integrated language:** Python is also an integrated language because we can easily integrated python with other languages like c, c++, etc.
- **Interpreted Language:** Python is an Interpreted Language because Python code is executed line by line at a time. like other languages C, C++, Java, etc.

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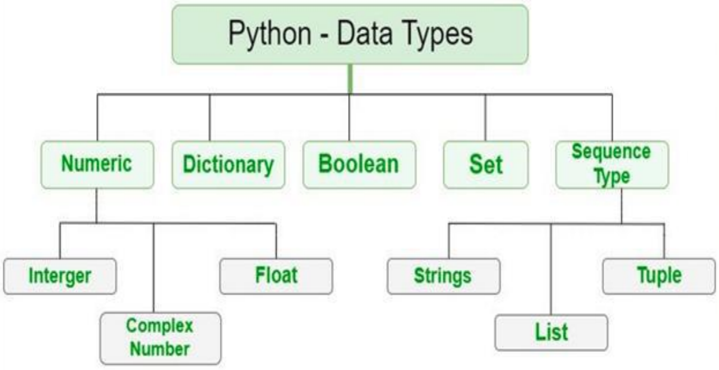


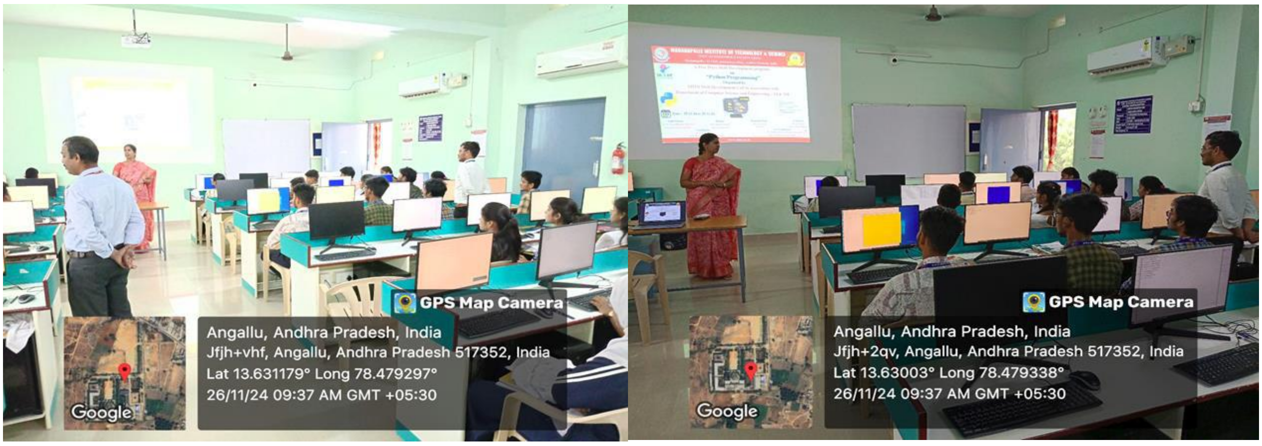
Python Data Types

- Data types are the classification or categorization of data items.

- It represents the kind of value that tells what operations can be performed on a particular data. Since everything is an object in Python programming, data types are actually classes and variables are instance (object) of these classes.

Numeric

- In Python, numeric data type represents the data which has numeric value.
- Numeric value can be integer, floating number or even complex numbers.
- These values are defined as int, float and complex class in Python.
- **Integers** – This value is represented by int class. It contains positive or negative whole numbers (without fraction or decimal). In Python there is no limit to how long an integer value can be.
- **Float** – This value is represented by float class. It is a real number with floating point representation.
- **Complex Numbers** – Complex number is represented by complex class. It is specified as *(real part)* + *(imaginary part)j*. For example – 2+3j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Sequence Type

- In Python, sequence is the ordered collection of similar or different data types.
- Sequences allows to store multiple values in an organized and efficient fashion.
- **String:** In Python, Strings are arrays of bytes representing Unicode characters. A string is a collection of one or more characters put in a single quote, double-quote or triple quote.
- **List:** Lists are just like the arrays, declared in other languages which is an ordered collection of data. It is very flexible as the items in a list do not need to be of the same type.
- **Tuple:** Just like list, tuple is also an ordered collection of Python objects. The only difference between tuple and list is that tuples are immutable i.e. tuples cannot be modified after it is created.

Boolean:

- Data type with one of the two built-in values, True or False. Boolean objects that are equal to True are truthy (true), and those equal to False are falsy (false).

Set:

- In Python, a Set is an unordered collection of data types that is iterable, mutable and has no duplicate elements. The order of elements in a set is undefined though it may consist of various elements.

Dictionary:

- A dictionary in Python is an unordered collection of data values, used to store data values like a map, unlike other Data Types that hold only a single value as an element, a Dictionary holds a key: value pair. Key-value is provided in the dictionary to make it more optimized. Each key-value pair in a Dictionary is separated by a colon:, whereas each key is separated by a ‘comma’.

Day – 3 (27.11.2024): (Python Operators & Expressions)

- Python Operators in general are used to perform operations on values and variables. These are standard symbols used for the purpose of logical and arithmetic operations.

- **Arithmetic Operators**

    - Arithmetic operators are used to performing mathematical operations like addition, subtraction, multiplication, and division.

- **Comparison Operators**

    - Comparison or Relational operators compares the values. It either returns **True** or **False** according to the condition.

- **Logical Operators**

    - Logical operators perform Logical AND, Logical OR, and Logical NOT operations. It is used to combine conditional statements.

- **Bitwise Operators**

    - Bitwise operators act on bits and perform the bit-by-bit operations. These are used to operate on binary numbers.

- **Assignment Operators**

    - Assignment operators are used to assigning values to the variables.

- **Identity Operators**

    - **is** and **is not** are the identity operators both are used to check if two values are located on the same part of the memory. Two variables that are equal do not imply that they are identical.

- **Membership Operators**

    - **in** and **not in** are the membership operators; used to test whether a value or variable is in a sequence.

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Expressions:

- An expression is a combination of operators and operands that is interpreted to produce some other value. In any programming language, an expression is evaluated as per the precedence of its operators. So that if there is more than one operator in an expression, their precedence decides which operation will be performed first.
- **Constant Expressions:** These are the expressions that have constant values only.
- **Arithmetic Expressions:** An arithmetic expression is a combination of numeric values, operators, and sometimes parenthesis.
- **Integral Expressions:** These are the kind of expressions that produce only integer results after all computations and type conversions.
- **Floating Expressions:** These are the kind of expressions which produce floating point numbers as result after all computations and type conversions.
- **Relational Expressions:** In these types of expressions, arithmetic expressions are written on both sides of relational operator (>, <, >=, <=).
- **Logical Expressions:** These are kinds of expressions that result in either *True* or *False*.
- **Bitwise Expressions:** These are the kind of expressions in which computations are performed at bit level.
- **Combinational Expressions:** We can also use different types of expressions in a single expression, and that will be termed as combinational expressions.

Day – 4(28.11.2024): (Conditional Statements)

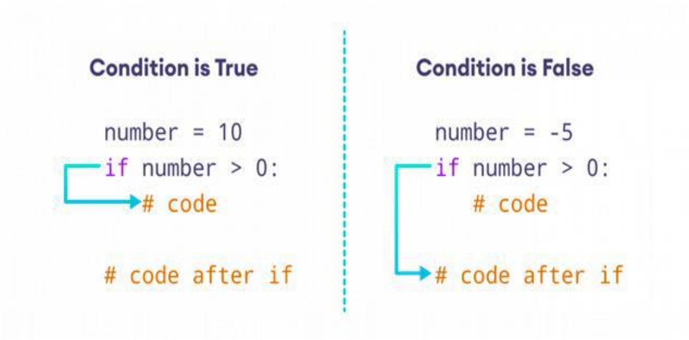
- Normally the sequence of execution of a program is in the order in which the statements are physically present. The statements which change the sequence of execution are called as control statements. They also decide how the flow of control is going to take place.

The different ways of using if statement are listed below

1. Simple if
2. If…. Else
3. Ladder if
4. Nested if

Simple if:

- If is a keyword and expression is either relational expression or logical expression**:** is must as part of syntax. All the statements that come under if must be given indentation.

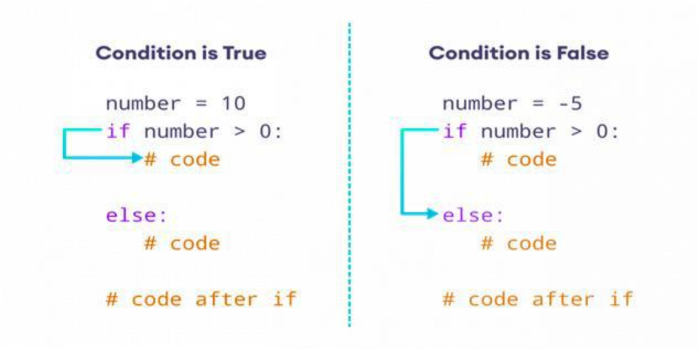


```
number = 10
if number > 0:
    # code

# code after if
```

```
number = -5
if number > 0:
    # code

# code after if
```

if… else:

- When expression generates a true value, true block is going to be executed otherwise false block is going to be executed. So always one and only one block between the two blocks is executed.

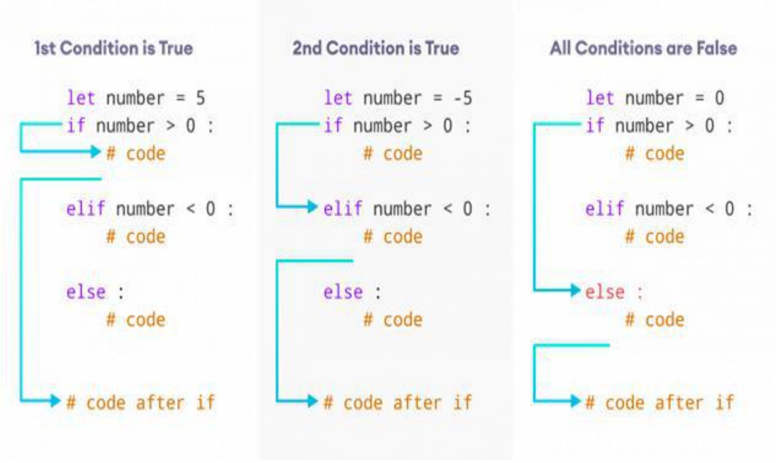


```
number = 10
if number > 0:
    # code

else:
    # code

# code after if
```

```
number = -5
if number > 0:
    # code

else:
    # code

# code after if
```

ladder if:

- The if...else statement is used to execute a block of code among two alternatives. However, if we need to make a choice between more than two alternatives, we use the if...elif...else statement.



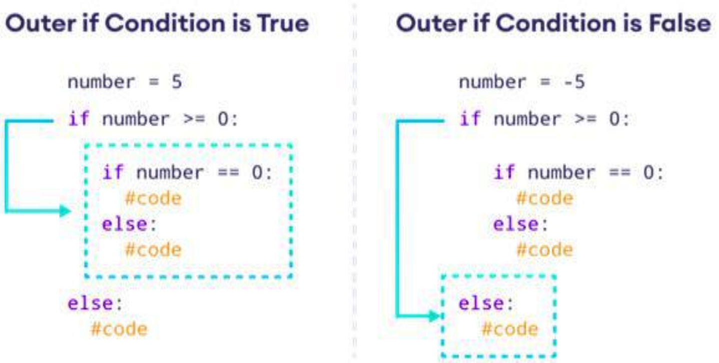
```
let number = 5
if number > 0 :
    # code

elif number < 0 :
    # code

else :
    # code


# code after if
```

```
let number = -5
if number > 0 :
    # code

elif number < 0 :
    # code

else :
    # code


# code after if
```

```
let number = 0
if number > 0 :
    # code

elif number < 0 :
    # code

else :
    # code


# code after if
```

nested if else:

- Nesting is a common concept in programming where an entity is kept inside similar kind of entity. For example, nested if, nested loop and so on. In nested if an if else part is kept in another if part or another else part.



Outer if Condition is True

```
number = 5
if number >= 0:
    if number == 0:
      #code
    else:
      #code
else:
  #code
```

Outer if Condition is False

```
number = -5
if number >= 0:

    if number == 0:
      #code
    else:
      #code
else:
  #code
```

Day – 5 (29.11.2024): (Control & Jump Statements)

Loops:

- Loop is a control structure used to repeat a set of statements that repetition may happen fixed number of times as long as condition remains true. They are two kinds of loops
- While loop
- For loop
- Every loop is associated with a variable called control variable which controls number of times the loop is going to be executed. Every loop is generally associated with three statements as below.
- Initialization
- Termination
- Update statement

While loop:

- The while loop consists of header and body as given in syntax. The header is associated with terminal condition. The body of the loop contains the statements which are repeated. The initialization statement related with control variable must be present before the loop begins.

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For loop:

- For loop is very frequently used and very powerful looping structure in python. The necessary statements related are

Control variable: control variable is present in the loop header itself with the help of range

Range: Range is a generator to generate a series of integer in a given range.

- Range generates a series from start to stop(excluding) each time the series is incremented by 1, When the start and update are optional. When not mentioned default start value is ‘0’ and default update value is ‘+1’.

In range when update is positive, start value must be less than stop value. If update is negative, start value must be greater than stop value.

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Break Statement:

- Break is a control statement which is used only inside the loop.A loop is terminated when the condition is false, it is called as normal termination. But sometimes when something unusual is happening from inside the body of the loop, then loop needs to be terminated then and their itself is called as abnormal termination. The break statement terminates the loop abruptly(suddenly).

- **Loop with else:**

  - In python else can be attached to a loop. In the loop with else, the else part is executed only when loop is terminated normally. The normal termination of loop happens when the condition becomes false or when the loop is executed from beginning to end. The else part is not executed when the loop is terminated abnormally. i.e., with break.

- **Continue Statement:**

  - Continue is another control statement used in the loop like break. Continue can be used only inside the loop. Break when executed terminates the loop abruptly but continue when executed skips the remaining statements of the loop for that particular iteration and continue with the next iteration.

Pass Statement

- It is used when a statement is required syntactically but you do not want any command or code to execute. The pass statement is a *null* operation; nothing happens when it executes. The pass is also useful in places where your code will eventually go, but has not been written yet.

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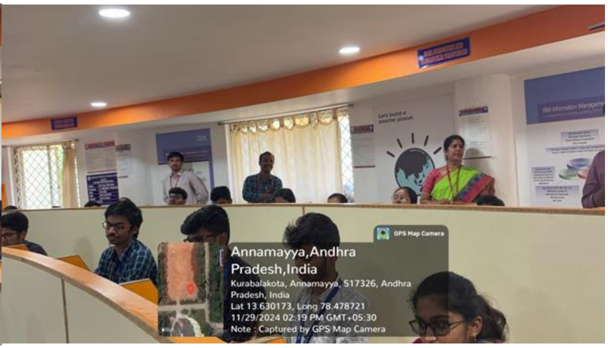
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Vote of thanks

The five-day event formally concluded with a vote of thanks delivered by **Mr. BSH. Shayeez Ahamed, Assistant Professor**, **Department of CSE – AI & ML**. He expressed sincere gratitude to the internal resource person for the time to share her expertise. He extended his thanks to the Management, Principal and HOD for their support to conduct the workshop.

Outcomes:

At the end of event, Students will be able to

1. Students will learn how to write Algorithms.
2. Students will develop flowcharts.
3. Students will get to know the different data types used in python programming.
4. Students will develop basic programs by using the concept of operators & expressions in python programming.
5. Students will get to know the conditional & control statements in python programming.