

I N D E X

NAME: S. Balaji STD: B.Tech SEC: IT ROLL NO.: Python Programming

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A.		ALGORITHM		
1.		Definition, Purpose, Example		
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10.		Searching Techniques		
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1.		Definition, Symbols, Table, Example		
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C.		PSEUDO CODE		
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2.		Guidelines for Writing Pseudo Code		
3.		Common Keywords In Pseudo Code		
4.		Syntax of Pseudo Code		
5.		Advantages, Disadvantages		
		Algorithm vs Flowchart vs Pseudo code		

D.

PROGRAM / PROGRAMMING LANGUAGE

- 1 Definition, Example
- 2 Types of Programming languages
- 3 Machine (or) Binary (or) Low-Level Language
- 3.1 Assembly (or) Intermediate Language
- 3.2 High-level language
- 3.3 Compiler
- 3.3.1 Interpreter
- 3.3.2 Advantages, Disadvantages
- 3.3.3 Computer System Level Hierarchy
- 4 Categories (or) Classification of High Level language
- 4.1 Basis: Commercial
- 4.1.1 Commercial Programming Language
- 4.1.2 Scientific Programming Language
- 4.1.3 Special Purpose Programming Language
- 4.1.4 General Purpose Programming Language
- 4.2 Basis: Design Paradigm
- 4.2.1 Markup Programming Language
- 4.2.2 Concurrent (or) Parallel Programming language
- 4.2.3 Scripting Programming language
- 4.2.4 Compiled Programming language
- 4.2.5 Interpreted Programming Language
- 4.2.6 Procedural Programming language
- 4.2.7 Functional (or) Modular Programming language
- 4.2.8 Object-oriented Programming language
- 5 Algorithmic Problem Solving
- 6 Simple Strategies for Developing Algorithms
- 6.1 Iteration
- 6.2 Recursion
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- 7 Building Blocks of Algorithm
- 7.1 Statement
- 7.2 State
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- 7.3.1 Sequence
- 7.3.2 Selection
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- 7.5 Modules
- 7.6 Classes and Objects

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1	History, Definition, Characteristics (or) Features		
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7.2	Text Editors • Notepad • VSCode • PyCharm • Jupyter		
7.3	Online Editors		
8	Python Pre-Requisites		
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8.3.2.2	Running Script (Execution)		
8.3.3	Interactive Mode vs Script Mode		
8.4	Building Blocks of Code		

A. PROCEDURAL PROGRAMMING APPROACH

- 1 User System Interaction (USI) (or) Human Computer Interaction (HCI)
 - 1.1 Input Function - `input()`
 - 1.1.1 Without Prompt String
 - 1.1.2 With Prompt String
 - 1.1.3 Single Input
 - 1.1.4 Multiple Inputs
 - 1.1.5 Command Line Input
 - 1.2 Output Function - `print()`
 - 1.2.1 Single Output
 - 1.2.2 Multiple Output
 - 1.2.3 self Parameter
 - 1.2.4 end Parameter
- 2 Statement (or) Line (or) Instruction
 - 2.1 Physical Line
 - 2.1.1 Multiple Assignments In A Single Line Statement
 - 2.1.2 Multiline Statements In A Single Line Statement
 - 2.2 logical line
 - 2.2.1 Explicit Line Continuation
 - 2.2.2 Implicit Line Continuation
 - 2.2.3 Blank Line
 - 2.2.4 Whitespace
 - 2.2.5 Indentation
 - 2.2.6 Comments, Docstrings
 - 2.2.7 Single Line Comment
 - 2.2.8 Multi Line Comment

- 2.2.3.33 Docstring Comments
 2.2.3.4 Form Feed
 2.2.4 Block (or) Suite
 2.2.5 Tokens
 2.2.5.1 Identifier
 2.2.5.1.1 Naming conventions
 2.2.5.1.2 Variables, Functions, Modules, Classes (Declaration Syntax)
 2.2.5.2 Keywords (Types: 10)
 2.2.5.2.1 Value Keywords
 2.2.5.2.2 Operator Keywords
 2.2.5.2.3 Branching Keywords
 2.2.5.2.4 Iteration Keywords
 2.2.5.2.5 Structure Keywords
 2.2.5.2.6 Returning Keywords
 2.2.5.2.7 Variable Handling Keywords
 2.2.5.2.8 Import Keywords
 2.2.5.2.9 Exceptional Handling Keywords
 2.2.5.2.10 Asynchronous Keywords
 2.2.5.3 Delimiters
 2.2.5.4 Literals (or) Data (or) Constants (or) Datatypes
 2.2.5.4.1 Numeric
 2.2.5.4.1.1 Integer - Decimal • Octal • Hexadecimal • Binary
 2.2.5.4.2.2 Float - Floating Point • Scientific (or) Exponent
 2.2.5.4.3.3 Complex
 2.2.5.4.4 Boolean (or) Logical
 2.2.5.4.3 Binary
 2.2.5.4.3.1 Bytes
 2.2.5.4.3.2 bytearray
 2.2.5.4.3.3 memoryview
 2.2.5.4.4 None
 2.2.5.4.5 ordered Collection (or) Sequence
 2.2.5.4.5.1 String
 2.2.5.4.5.2 List
 2.2.5.4.5.3 Tuple
 2.2.5.4.5.4 Range
 2.2.5.4.6 Unordered Collection (or) Non-Sequence
 2.2.5.4.6.1 Sets - Set • Frozen set
 2.2.5.4.6.2 Mapping - Dictionary
 2.2.5.5 Operators
 2.2.5.5.1 Arithmetic
 2.2.5.5.2 Relational (or) Comparison
 2.2.5.5.3 Logical
 2.2.5.5.4 Bitwise
 2.2.5.5.5 Assignment
 2.2.5.5.6 Membership
 2.2.5.5.7 Identity
 2.2.5.5.8 Conditional (or) Ternary
 2.2.5.5.9 Miscellaneous - dot • group • subscript • slice • delims • divisor
 2.2.5.5.10 Operator Precedence
 2.2.5.5.10.1 Operators Precedency Table
 2.2.5.5.10.2 Expression, Evaluation of Expression
 3 State
 4 Control Flow
 4.1 Sequential
 4.2 Alternative (or) Branching
 4.2.1 Selection (or) Conditional Branching

- 4.2.1.1 Conditional (or) Simple If
- 4.2.1.2 Alternative If - else
- 4.2.1.3 Chained If - Elif - Else
- 4.2.1.4 Nested If - Else (or) Nested Conditionals
- 4.2.1.5 Match Case • match expression • case - pattern (5 types of patterns)
- 4.2.2 Dumb (or) Unconditional Branching
- 4.2.2.1 Break
- 4.2.2.2 Continue
- 4.2.2.3 Pass
- 4.3 Iterative (or) Looping (or) Repetitive
- 4.3.1 For Loop
- 4.3.2 While Loop • Initialization • Condition • update
- 4.3.3 Nested Loop
- 4.3.3.1 Nested For
- 4.3.3.2 Nested While
- 4.3.3.3 Nested For-While
- 4.3.3.4 Nested While-For
- 5 Exceptional Handling
- 5.1 Errors, Exceptions
- 5.2 Types of errors (Basis: Situation)
- 5.2.1 Compile-time
- 5.2.2 Logical
- 5.2.3 Run-time
- 5.3 Types of statement (Basis : error)
- 5.3.1 Normal Statement
- 5.3.2 Critical Statement
- 5.4 Exceptional Handling
- 5.4.1 Try Block
- 5.4.2 Except Block
- 5.4.3 Finally Block
- 5.4.4 instead exception
- 5.4.4.1 Raise Keyword
- 5.4.4.2 Assert Keyword



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B.		MODULAR PROGRAMMING APPROACH		
1		Functions		
1.1		Definition		
1.2		Need, Advantages		
1.3		Elements Of Functions		
1.3.1		Function Definition		
1.3.1.1		Function Header		
1.3.1.1.1		Def Keyword		
1.3.1.1.2		Function Name		
1.3.1.1.3		Parameter List		
1.3.1.1.4		Colon		
1.3.1.2		Function Body		
1.3.1.2.1		Indentation, Block		
1.3.1.2.2		Nested Block		
1.3.1.2.3		Return Statement (or) Value		
1.3.1.2.4		Docstring statement		
1.3.2		Function Call		
1.3.2.1		Function Name		
1.3.2.2		Argument list		
1.3.3		Basis: Return Value		
1.3.3.1		Fruitful Function		
1.3.2		Void Function		
1.3.4		Basis: Purpose (or) Usage (or) Craft		
1.4.1		Built-in (or) Pre-Defined Function		
1.4.2		User-Defined Function		

- 1.3.4.2.1 Normal Functions
- 1.3.4.2.2 Nested Functions
- 1.3.4.2.3 Recursive Functions - Base Condition, Recursive Condition
- 1.3.4.2.4 Decorators (or) Wrapper Functions
- 1.3.4.2.5 Generators
- 1.3.4.3 Lambda Functions (or) Anonymous Functions
- 1.3.4.2.6 Filter
- 1.3.4.2.7 Map
- 1.3.4.2.8 Reduce
- 1.3.4.2.9 Parameters
- 1.3.4.2.10 Arguments
- 1.3.4.2.11 Binding of parameters to arguments (or) Function Prototypes
- 1.3.4.2.12.1 No arguments - No return value
- 1.3.4.2.12.2 With arguments - No return value
- 1.3.4.2.13.3 No arguments - With return value
- 1.3.4.2.13.4 With arguments - With return value
- 1.3.4.2.14 Types of Arguments (or) Parameters (Basis: Specification)
- 1.3.4.2.14.1 Formal Parameters (Arguments)
- 1.3.4.2.14.2 Actual Parameters (Parameters)
- 1.3.4.2.15 Types of Arguments (Basis: Flexibility)
- 1.3.4.2.15.1 Fixed Function Arguments
- 1.3.4.2.15.2 Positional (or) Required Arguments
- 1.3.4.2.15.3 Variable Function Arguments
- 1.3.4.2.15.22.1 Keyword Arguments
- 1.3.4.2.15.22.2 Default Arguments
- 1.3.4.2.15.22.3 Variable Length (or) Arbitrary Arguments
- 1.3.4.2.15.22.3.1 Non-keyword Variable Length Arguments
- 1.3.4.2.15.22.3.2 Keyword Variable Length Arguments
- 1.3.4.2.16 Argument Passing (or) Calling Methods
- 1.3.4.2.16.1 Call (or) Pass By Value
- 1.3.4.2.16.2 Call (or) Pass By Reference
- 1.3.4.2.17 Scope of Variables
- 1.3.4.2.17.1 Global
- 1.3.4.2.17.2 Local
- 1.3.4.2.17.3 Non-local (or) Enclosed (or) Enclosing
- 1.3.4.2.17.4 Built-In (or) Library
- 1.3.4.2.17.5 Hierarchy of Scopes (LEGB Rule)
- 1.3.4.2.18 Function Composition
- 1.3.4.2.19.1 Base/Calling Function
- 1.3.4.2.19.1 Direct Recursive Function
- 1.3.4.2.19.2 Indirect Recursive Function
- 1.3.4.2.20 Basis
- 1.3.4.2.21 Tail Recursion
- 1.3.4.2.22 Non-Tail Recursion
- 1.3.5 Basis: Dependency of Return Value On Argument
- 1.3.5.1 Pure Function
- 1.3.5.2 Impure Function

2 Modules

2.1 Definition

2.2 Advantages

2.3 Accessing members of modules

2.4 Types of Modules

2.4.1 Built-in Modules

2.4.1.1 math module

2.4.1.2 random module

2.4.1.3 os module

2.4.1.4 sys module

2.4.1.5 calendar module

2.4.1.6 time module

2.4.1.7 datetime module

2.4.1.8 string module

2.4.1.9 numbers module

2.4.1.10

2.4.2 User-defined Modules

2.4.2.1 Import Statements (or) Ways to Import

2.4.2.1.1 import

2.4.2.1.2 import..as..

2.4.2.1.3.1 from..import..

2.4.2.1.3.2 from..import *

2.4.2.1.4 from..import..as

2.4.2.2 dir() function

3 Packages

3.1 Definition

3.2 Advantages

3.3.1 Creation of Packages

3.3.2 Running of Packages

3.4 Package Manager

3.4.1 PIP

3.4.1.1 Definition

3.4.1.2 PIP Commands In CMD (Windows)

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3.4.1.2.3 Check compatible Dependencies of Installed Packages

3.4.1.2.4 List Installed Packages with their Versions

3.4.1.2.5 Show Information of Installed Packages

3.4.1.2.6 Output Installed Packages in Requirements Format

3.4.1.2.7 Download Packages

3.4.1.2.8 Install Packages

3.4.1.2.9 Upgrade Packages

3.4.1.2.10 Downgrade Packages

3.4.1.2.11 Uninstall Packages

3.4.1.2.12 Get More Information Of A Specific Package (Metadata)

3.4.1.2.13 Generate Requirements.txt File

3.4.1.2.14 Get All Dependencies Installed Into System

3.4.2 Conda

Libraries

- 5 Important (or) Popular Functions, Modules, Packages And Libraries
- 5.1 Data Science
 - 5.2 Machine learning
 - 5.3 Deep learning
 - 5.4 Transfer Learning
 - 5.5 NLP
 - 5.6 Computer Vision
 - 5.7 Image Processing
 - 5.8 Data Visualization
 - 5.9 Data Analytics (Analysis) (or) Statistical Analysis
 - 5.10 Automation
 - 5.11 Automation Testing
 - 5.12 Chatbot Development
 - 5.13 GUI
 - 5.14 Web Development (Front-end Development)
 - 5.15 Mobile App Development
 - 5.16 Database Connectivity
 - 5.17 Ethical Hacking
 - 5.18 Others
 - 5.18.1 QR Code Generation
 - 5.18.2 Music
 - 5.18.3 Chess

I N D E X

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Object Oriented Programming

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4		Abstraction		

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7		Iterator		
2-2-3		Accessing Class Members		
2-2-3-1		Using class name in both inside and outside class		
2-2-3-2		Using self parameter inside class (creating new instance variable)		
2-2-3-3		Using object name outside class		
3-4-3		Accessing Object Members (^{instance})		
3-4-3-1		Using self parameter inside class		
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I N D E X

In Python

NAME: S. Balaji STD: 8-Top SEC: IT ROLL NO.: 101 Data Structures

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E.		DATA STRUCTURES		
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2.1.2		Null Nodes (None Nodes)		
2.2		Node Structure		
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3		Real-Life Application		
3.1		Online Ticket Booking System		
3.2		Web Browser		
3.3		Bank, Theatre, Restaurant, Library		
3.4		Music Player		
3.5		Google Map		
3.6		Database Indexing, File Explorer, SEO		
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3.8		Web Search, Process Scheduling		
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3.10		Text-fail-text-search (MS Word)		
3.11		Auto-completion, Dictionary Application		
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3.13		Heap Sort, K-th smallest/largest of no.		
3.14		Cell Phone Contacts, Speech Processing		
3.15		Search Engine, Spell Checkers, Digital Fossils		
4		Primitive Data Structure		
4.1		Integer		
4.2		Floating		
4.3		Complex		
4.4		Boolean		
4.5		String		

5 Non-Primitive Data Structures

Built-In Data Structure

5.1 List

5.1.1.1 Definition, Example

5.1.1.2 List Structure

5.1.1.3 Mutability

5.1.1.4 List Operations

5.1.1.4.1 Creation

5.1.1.4.2 Indexing

5.1.1.4.3 Concatenation

5.1.1.4.4 Slicing

5.1.1.4.5 Repetition

5.1.1.4.6 Update (or) Modification

5.1.1.4.7 Membership

5.1.1.4.8 Comparison

5.1.1.4.9 Slicing, Stride When Slicing

5.1.1.4.10 Copying (or) Aliasing

5.1.1.4.11 Cloning (or) Duplication

5.1.1.4.12 Deletion

5.1.1.4.13 Advanced List Processing

5.1.1.4.14 List Comprehension

5.1.1.4.15 Accessing List Elements

5.1.2 Tuple

(same as list except Aliasing, Modification)

5.1.2.1 Tuple Structure

5.1.2.2 Immutability

5.1.2.3 Tuple Operations (except modification, aliasing)

5.1.2.4 Advanced Tuple Processing

5.1.2.4.1 Tuple Comprehension

5.1.2.4.2 Accessing Tuple Elements

5.1.2.4.3 Tuple as Argument

5.1.2.4.4 Tuple as Return Value

5.1.3 Set

5.1.3.1 Definition, Example

5.1.3.2 Set Structure (Hashing) (or) (Non-decreasing)

5.1.3.3 Mutability

5.1.3.4

I N D E X

NAME: Balaji S STD.: IT SEC.: IT ROLL NO.: 5205 SUB.: Data Structures in Python-②

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6.1		User Defined Data Structure		
6.1.1		Array (List to List)		
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6.1.2.1.2		Node Class Creation		
6.1.2.1.3		SLL Class Creation		
6.1.2.1.4		Node, SLL Objects Creation		
6.1.2.1.5		Allocating memory for nodes		
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6.1.2.1.7		SLL Operation		
6.1.2.1.7.1		Traversing, Displaying (or) Printing All Node Data		
6.1.2.1.7.2		Inserting A Node At Head Beginning of A SLL		
6.1.2.1.7.3		Inserting A Node At Tail		
6.1.2.1.7.4		End of A SLL		
6.1.2.1.7.5		Inserting A Node At 2 nd Position		
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6.1.2.1.7.7		Searching A Node In A SLL		
6.1.2.1.7.8		Deleting A Node At 2 nd Position		
6.1.2.1.8		End of A SLL		
6.1.2.1.9		Deleting A Node At Tail		
6.1.2.2		Middle of A SLL		
6.1.2.3		Time Complexity		
6.1.2.3.1		Space Complexity		
6.1.2.3.2		Doubly Linked List (DLL)		
6.1.2.3.3		Circular Singly Linked List (CSLL)		
6.1.2.1.7.9		Circular Doubly Linked List (CDLL)		
		Real life Applications		
		Monitoring (or) Reversing A SLL		

