Introduction to Programming

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Lecture 0

Introduction 〉 Structure

1. **Three Parts** : Lecture, Tutorial, Laboratory
2. Class divided into three parts - each with a different tutor
3. Grading:
   - Tierce I - 10%
   - Tierce II - 20%
   - Tierce III - 30%
   - Lab Evaluations - 35%
   - Quizzes - 5%

Introduction 〉 Remarks

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5. **BE INQUISITIVE** : Don’t be afraid to try new things.

Goal

How Machines Work?

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Constant Interaction

Goal 〉 Machines

Calculator

Press 123

Press ’+’

Press 456

Press ’=’

Goal 〉 Machines

Calculator

Press 123

Press ’+’

Press 456

Press ’=’

Goal 〉 Digital Computers

Read and understand all instructions (Compile)

Goal 〉 Digital Computers

Read and understand all instructions (Compile)

Carry out instructions (Execute)

Goal 〉 Powers of Computers

- Handle numbers
  - Numbers of different sizes (5,256,3.14E10)
- Perform Operations on Numbers
  - Addition, subtraction, multiplication, division,. . ..
- Store Data/Numbers
  - Memory Locations
- Execute basic instructions
  - Take input and/or give output.
  - Make (limited) decisions
- Does not have any cognitive power.

Instructing Computers

Programming Computers

Computational thinking

Computational thinking

inputs → algorithms → outputs

Computational thinking

inputs → algorithms → **outputs**

Goal 〉 Input/Output

Decimal

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Binary

0, 1

Goal 〉 Input/Output

153

Goal 〉 Input/Output

100	10	1
1	5	3
100 × 1	10 × 5	1 × 3

Goal 〉 Input/Output

0 1 1

Goal 〉 Input/Output

4	2	1
0	1	1
4× 0	2 × 1	1 × 1

100

Goal 〉 Input/Output

4	2	1
1	0	0
4× 1	2 × 0	1 × 0

Goal 〉 ASCII

A	B	C	D	E	F	G	H	I	J	K	L	M
65	66	67	68	69	70	71	72	73	74	75	76	77

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
78	79	80	81	82	83	84	85	86	87	88	89	90

Goal 〉 Input/Output

72 73 33

Goal 〉 Input/Output

H I !

72 73 33

Goal 〉 Input/Output

72 73 33

Computational thinking

inputs → **algorithms** → outputs

Dictionary Lookup

Pseudocode

Algorithms 〉 Dictionary Lookup

1. Pick up the Dictionary
2. Open to the middle of the dictionary
3. Look at words
4. If “Debate” is among the words
   See the meaning
5. else if “Debate” is earlier in the book
   Open to the middle of the left half of book
   Go to line 3
6. else if “Debate” is later in the book
   Open to the middle of the right half of the book
   Go to line 3
7. else
   Give up

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Algorithms 〉 Recipe

- Recipe to obtain output from input.
- How exactly to tell this recipe/set of instructions to computers?

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- Programming Languages

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- Programming Languages

Python [Guido van Rossum]

Basics/Fundamentals

The Workflow

edit → **compile** → execute

Basics 〉 OS Commands

- `pwd`
- `ls`
- `cd`
- `mkdir`
- `vi`
- `mv`
- `rm`

Basics 〉 Homeserver

Servers work1.iitbhilai.ac.in, work2.iitbhilai.ac.in, work3.iitbhilai.ac.in

Basics 〉 Homeserver

Servers work1.iitbhilai.ac.in, work2.iitbhilai.ac.in, work3.iitbhilai.ac.in

Access ssh, rdp

Basics 〉 Homeserver

Servers	work1.iitbhilai.ac.in, work2.iitbhilai.ac.in, work3.iitbhilai.ac.in
Access	ssh, rdp
Programs	python, python3

Python Programming Language

Hello World 〉 Program

```
print(“Hello World!”)
```

Hello World 〉 Examples

```
print(“Hello Amit”)
```

Hello World 〉 Examples

```
print(“                                    Hello World”)
```

Hello World 〉 Examples

```
print(“Hello World\n Hello Amit”)
```

That's It 〉 Questions?

Thank You

For Your Kind Attention