Introduction to Programming

Amit Kumar Dhar

Office: 306 email: amitkdhar@iitbhilai

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%

 NO PRE-REQUISITES: Prior knowledge of programming MIGHT be helpful, but not necessary.

- 1. **NO PRE-REQUISITES**: Prior knowledge of programming MIGHT be helpful, but not necessary.
- 2. **BE REGULAR**: Attend classes, complete lab assignments, practice problems ...

- NO PRE-REQUISITES: Prior knowledge of programming MIGHT be helpful, but not necessary.
- 2. **BE REGULAR**: Attend classes, complete lab assignments, practice problems ...
- 3. **ASK QUESTIONS**: About 10 other students are having the same doubt as you.

- NO PRE-REQUISITES: Prior knowledge of programming MIGHT be helpful, but not necessary.
- 2. **BE REGULAR**: Attend classes, complete lab assignments, practice problems ...
- 3. **ASK QUESTIONS**: About 10 other students are having the same doubt as you.
- 4. **BE RESPONSIVE**: Try to answer questions, wrong answers clear doubts.

- NO PRE-REQUISITES: Prior knowledge of programming MIGHT be helpful, but not necessary.
- 2. **BE REGULAR**: Attend classes, complete lab assignments, practice problems ...
- 3. **ASK QUESTIONS**: About 10 other students are having the same doubt as you.
- 4. **BE RESPONSIVE**: Try to answer questions, wrong answers clear doubts.
- 5. **BE INQUISITIVE**: Don't be afraid to try new things.

Goal

How Machines Work?

How Machines Work?

Constant Interaction

Calculator

Press 123

Press'+'

Press 456

Press '='

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

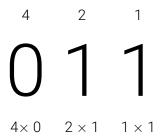
Decimal 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Binary

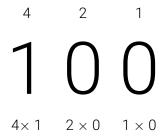
153

```
100 10 1
1 5 3
```

0 1 1



100



Goal > ASCII

72 73 33





72 73 33

Computational thinking inputs → algorithms → outputs

Algorithms > Searching

Dictionary Lookup

Algorithms > Searching

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
- else if "Debate" is earlier in the bookOpen to the middle of the left half of bookGo 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

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

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

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
- else if "Debate" is earlier in the bookOpen to the middle of the left half of bookGo 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

Algorithms > Recipe

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

Algorithms > Recipe

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

Algorithms > Recipe

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

Python [Guido van Rossum]

Basics/Fundamentals

Basics > Programming

The Workflow edit → compile → execute

Basics > OS Commands

- pwd
- ► ls
- ▶ cd
- ► mkdir
- ▶ vi
- ► m∨
- ► 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