

# ESC101: Introduction to Computing

## Course Logistics

# Instructor Details

Vinay P. Namboodiri

Office: Room No. 406,

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Dept of CSE

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# The Course

- The course teaches you how to solve problems using the computer.
- No prior exposure to programming is needed.

# Lectures, Tutorials

- Class is divided into 12 sections.
  - B1, B2, ..., B12
- Lectures common for all
  - Mon, Wed, Fri, 12 noon – 1 PM, L-7
- Tutorials
  - Tue, 12 noon – 1 PM, Tutorial Block.
  - T103(B1)-T112(B10) T203(B11)-T204(B12)

# Tutorials

- You can ask questions and clarify doubts regarding lecture material.
- Examples illustrating lecture material will be covered.
- There can be announced or un-announced quizzes in the tutorials.
  - Lectures may also have surprise quizzes.
- Tutorials start on August 2 (Tuesday).

# Labs

- Schedule: 2-5 pm
  - B1, B2, B3 : Monday
  - B4, B5, B6 : Tuesday
  - B10, B11, B12 : Wednesday
  - B7, B8, B9: Thursday
- <http://iitk.ac.in/doaa/data/coreschedule2016-17-1.pdf>
- Location:
  - Core Labs, Room-301 (near DoAA building)
- Labs start on August 1 (Monday).

# Labs

- ◆ Friday/Saturday/Sunday : Could be used to make up for lab days lost due to holidays.
- ◆ There will be Teaching Assistants (TAs) to help in the labs.
- ◆ In each lab, you will be given a few problems to solve.
  - Students must work on their own.
  - Discussion is allowed, but **sharing of code in any form is NOT permitted.**

# Lab Assignments

- ◆ Lab assignment will be posted on the day of the lab, at 2 PM.
  - It has to be submitted by 5 PM
  - The first lab starts from Monday 1st August
- ◆ In addition, there can be practice problems.
  - Can be done at your own pace.



# Weightage (Theory)

- Quizzes: 20%
  - Normal quizzes: total weight = 10%
    - ◆ Surprise quizzes!!
  - 2 Major Quizzes: each 5%.
- Midterm: 15%
- Final exam : 25%

# Weightage (Programming)

- Labs: 5%
  - Weightage of later labs may be more. (First lab: 0 weight)
  - **No make-up** lab for absentees.
- Lab exams: 35%
  - Mid-term lab exam: 15%
  - End-term lab exam: 20%



# Copying

- Copy at your own risk
  - in any component (lab/quiz/exams/lab exams).
- If you are caught, you get penalised on grade (most likely **F**).
  - Will not be allowed to drop the course
  - Case reported to DoAA/SSAC
  - **No warning or second chance**
  - **All parties involved** in copying will be held equally responsible. Copying from internet is penalized equally.
  - Policy may change on need basis

# Copying

- Read-protect your directories so that others cannot copy from your directory.
- Do not share your CC password with friends.
- Do not leave printouts, notes etc. containing your code unattended

<http://cse.iitk.ac.in/pages/AntiCheatingPolicy.html>

# Absentee Policy

When a student is absent from a quiz, lab or exam, and has approval for the leave from SUGC/Instructor

- Minor quizzes: **No** makeup. Best **n-1** quizzes to count.
- Major quizzes: **Prorated** (extrapolated) from the nearest future midterm or final exam
- Labs: **No** makeup
- Mid sem: **Prorated** by End sem
- Mid term lab exam: **Prorated** by final lab exam
- Final lab exam: **Prorated** by End sem
- End sem: **Makeup**, as per DoAA's schedule
- **Policy may change on need basis**

# Course Websites

- Course web site
  - <http://canvas.cse.iitk.ac.in/> To be available in a week
  - Lab web site
  - <http://esc101.cse.iitk.ac.in>
  - Login: your full iitk email address ([xyz@iitk.ac.in](mailto:xyz@iitk.ac.in))
  - Password: Same as that for your iitk email
- Sites available only from within IITK

# Course Materials

- ◆ All course materials, including lectures, exam solutions, quiz solutions etc., will be posted on course web sites.
- ◆ Use canvas for interaction
  - Allows instructor, tutors and your classmates to answer any issues

# Textbooks

- There are many books on C.
  - Schaum's Outline of Programming with C by Byron Gottfried, McGraw-Hill India.
  - Programming in ANSI C by Balaguruswamy.
  - The C Programming Language by Kernighan and Ritchie, Prentice-Hall India. (This is a standard reference to C. Slightly advanced though.)
  - Any other standard book on C would also be good.
- It is recommended that you have a book and refer to it throughout the semester and beyond.



# Mailing...

- Please make sure you mention your roll number and section in the emails
  - Prefer using discussion feature of canvas

# ESC101

## Introduction to Computing

# WELCOME

Vinay P. Namboodiri

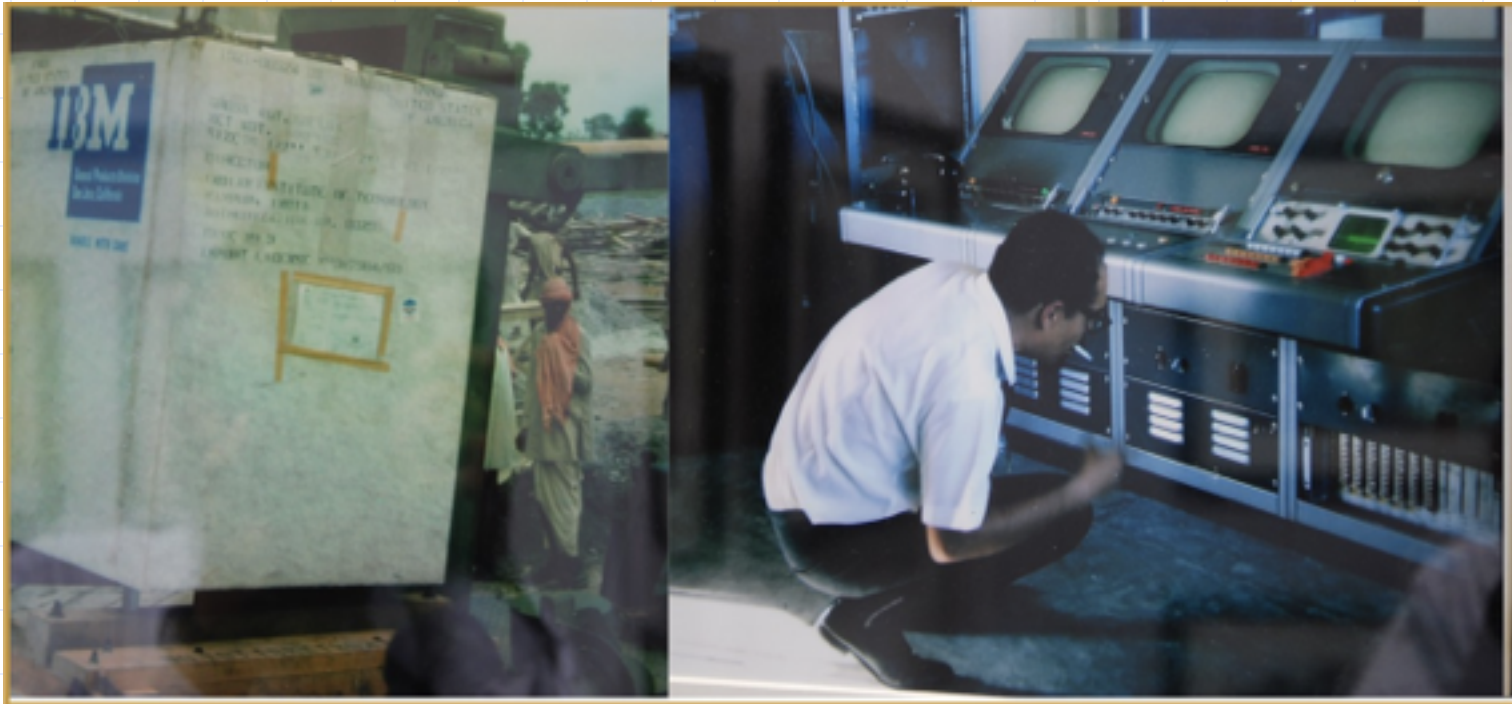
Dept. of CSE

IIT Kanpur

# ACKNOWLEDGEMENTS

- All previous instructors of Esc101 at IIT Kanpur. (esp. Prof. Ganguly & Prof. Karkare)
- MS Office clip art, various websites and images
  - \* The images/contents are used for teaching purpose and for fun. The copyright remains with the original creator. If you suspect a copyright violation, bring it to my notice and I will remove that image/content.

# Computers@IITK

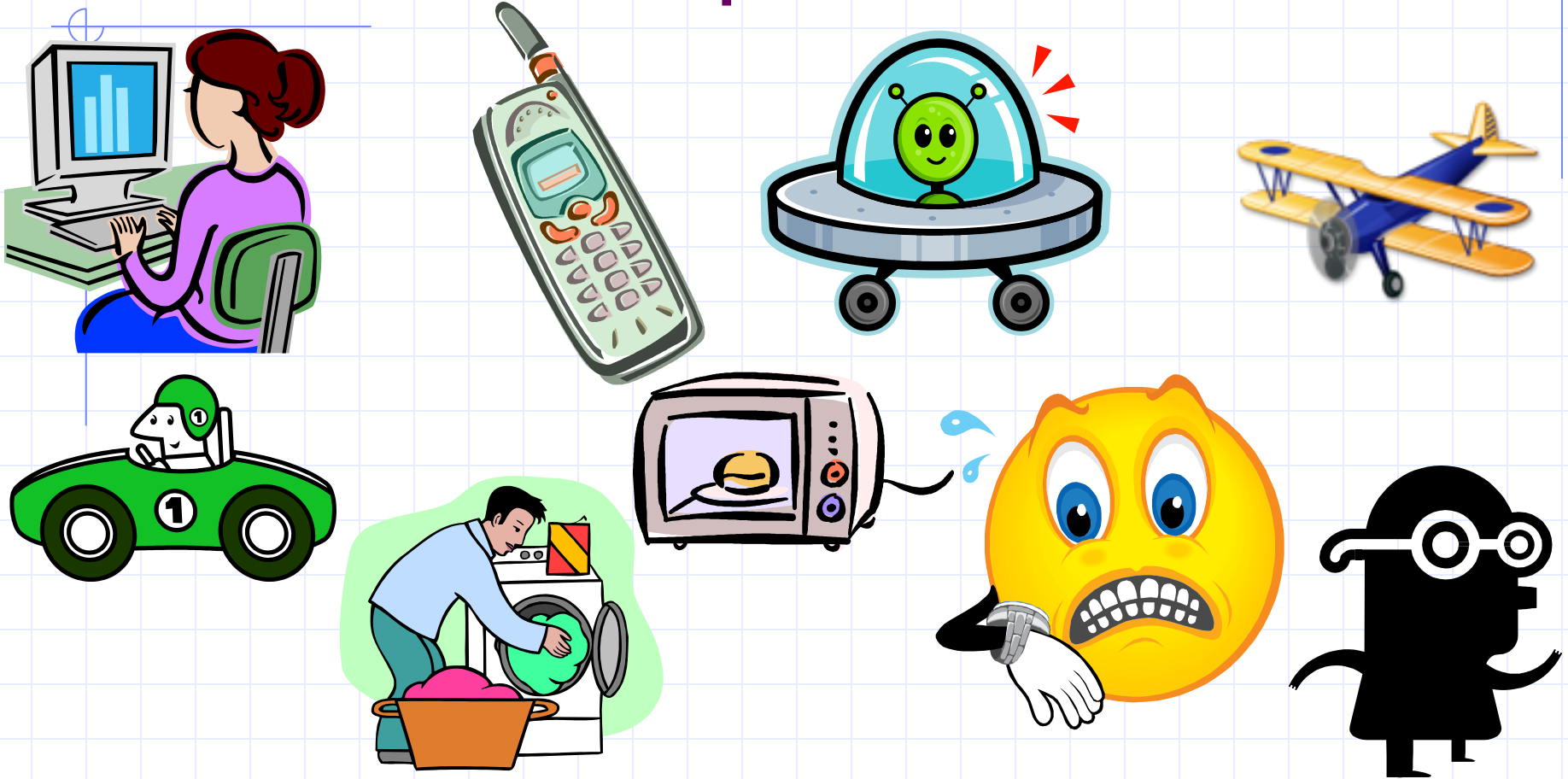


# The Course

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- The course teaches you how to solve problems using the computer.
- No prior exposure to programming is needed.

# What is a Computer?



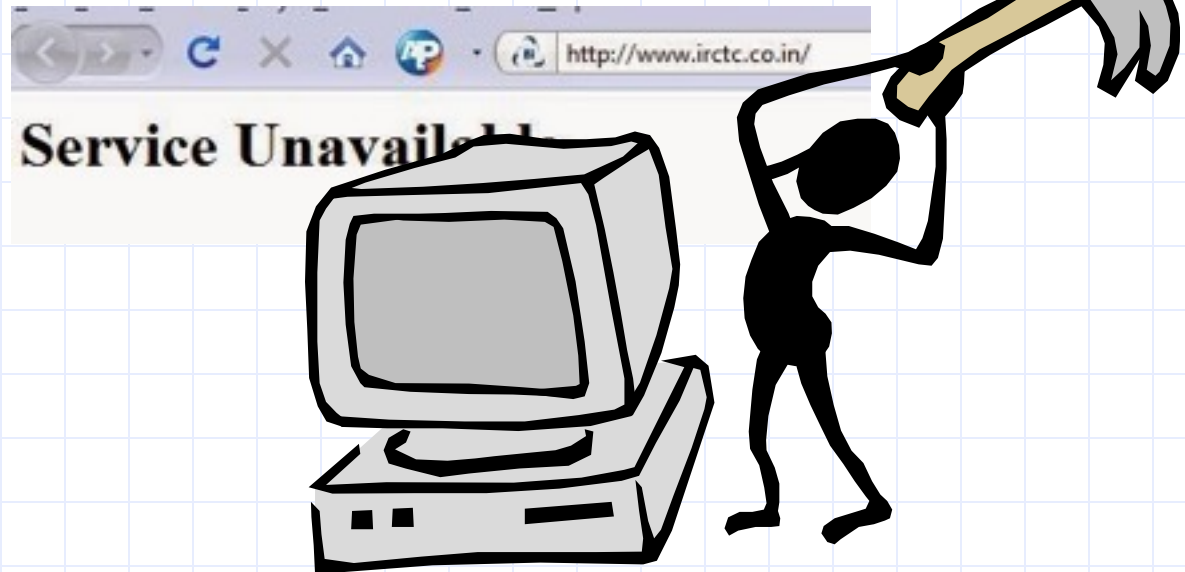
Almost all electronic gadgets today are Computers.  
They are everywhere!

# Why am I doing this course?

- ◆ Every discipline uses computing: All branches of engineering, sciences, design and arts.
- ◆ Understand how computers work
- ◆ Write your own programs
  - Automate boring repetitive stuff!

# Process of Programming: Step I

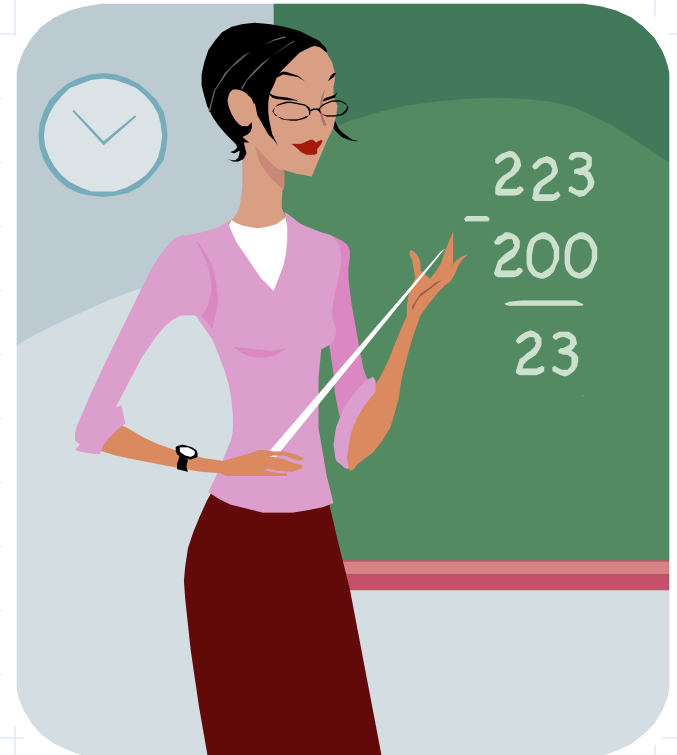
- Define and model the problem. In real-life this is important and complicated.
  - For example, consider modeling the Indian Railways reservation system.





# Process of Programming

- In this course, all problems will be defined precisely and will be simple



# Process of Programming: Step 2

- Obtain a logical solution to your problem.
- A logical solution is a finite and clear step-by-step procedure to solve your problem.
- Also called an Algorithm (or *recipe*).
  - We can visualize this using a Flowchart.
  - Very important step in the programming process.

# Algorithms in Ordinary Life? (Recipes!)

◆ An algorithm is a familiar concept: cooking recipes are almost algorithms! (not quite precise enough for a computer!)

## ◆ Ingredients

1. 1 liter (33 oz) ice cream (any flavor).
2. Crushed cereal, such as corn flakes, frosted flakes, cinnamon squares, or puffed rice.
3. Flour (a small bowl of it, approx 1/2 cup).
4. Oil (use an unflavoured oil that has a high heat point).
5. 2 eggs (beaten in a bowl large enough for dipping).
6. Cinnamon and/or sugar (optional).

## ◆ Instructions

1. Prepare the two baking sheets by lining with a silicon liner or parchment paper. Then place the sheets in the freezer for half an hour prior to making the ice cream balls.
2. Scoop symmetrical balls of ice cream. Try to make each scoop about **as large as your fist**. Make as many scoops as will fit on the baking sheets.
3. Harden the scooped ice cream balls in the freezer.
4. Set out the bowls for dipping. Place a bowl of flour, a bowl of beaten egg and a bowl of crushed cereal or fine cookie/cracker crumbs in the workspace, **in a formation that makes it easy to dip in order**.
5. Coat the ice cream.
6. Place the ice cream balls back on the baking sheets, then back in the freezer.
7. Fry the coated ice cream balls. Heat up the oil until it shimmers - approx 185C.
8. Serve the ice cream balls.

# Algorithms in real-life

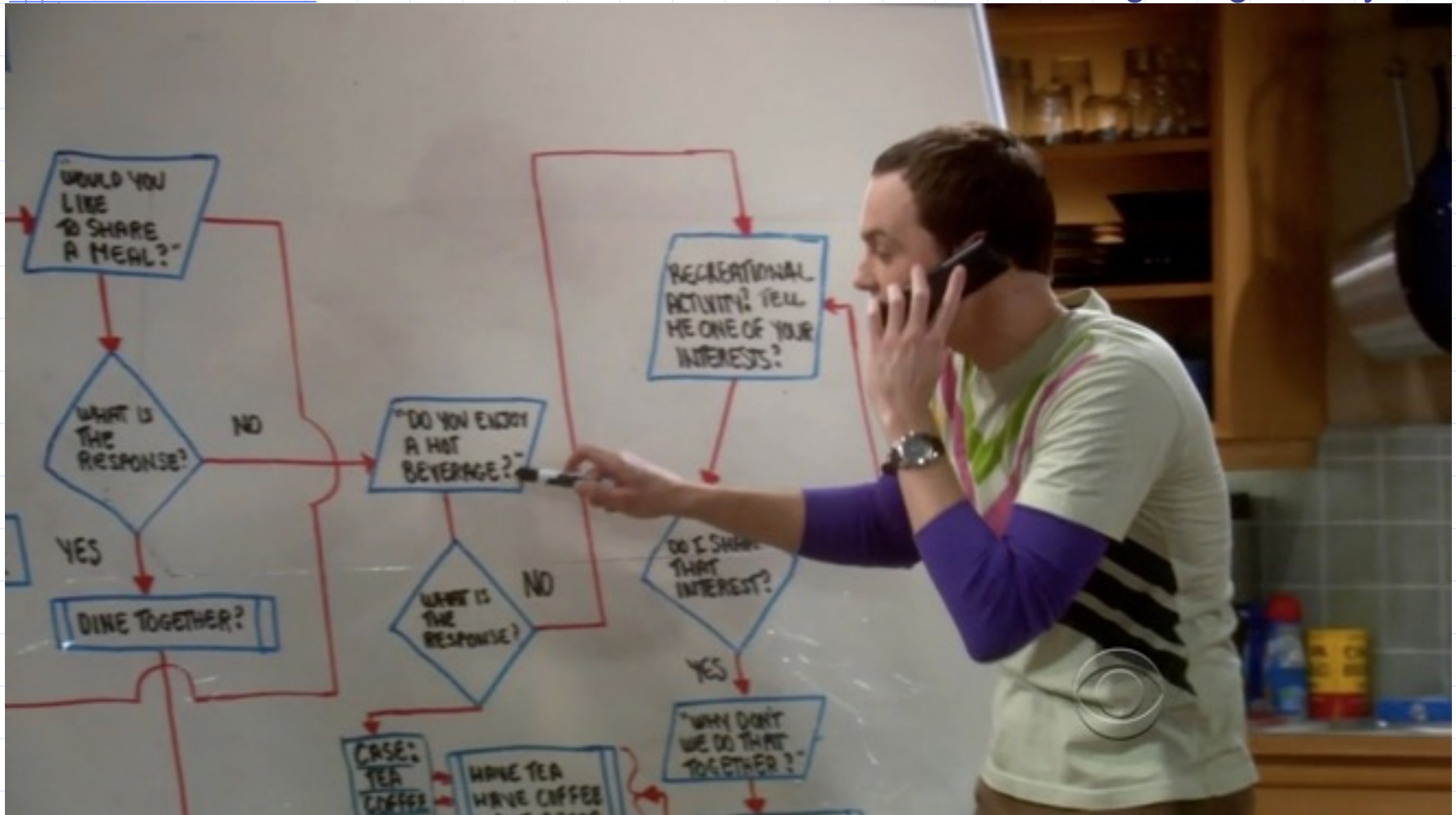
- Any step-by-step guide. e.g. Assembly instructions for a make-it-yourself kit.



<http://www.gocomics.com/calvinandhobbes/2009/06/02>

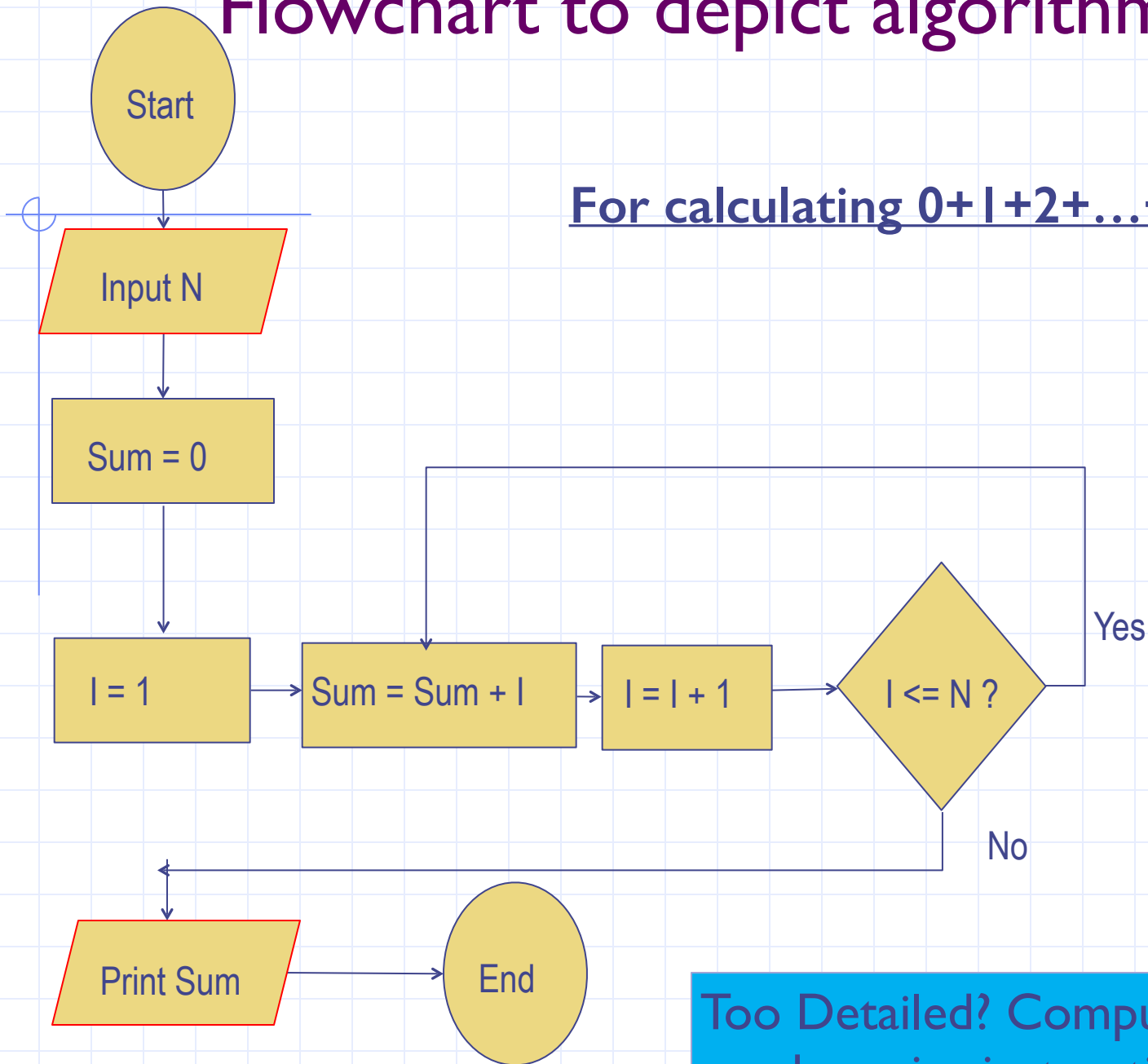
# Friendship Algorithm/Flowchart

Source: The Big Bang Theory



# Flowchart to depict algorithm

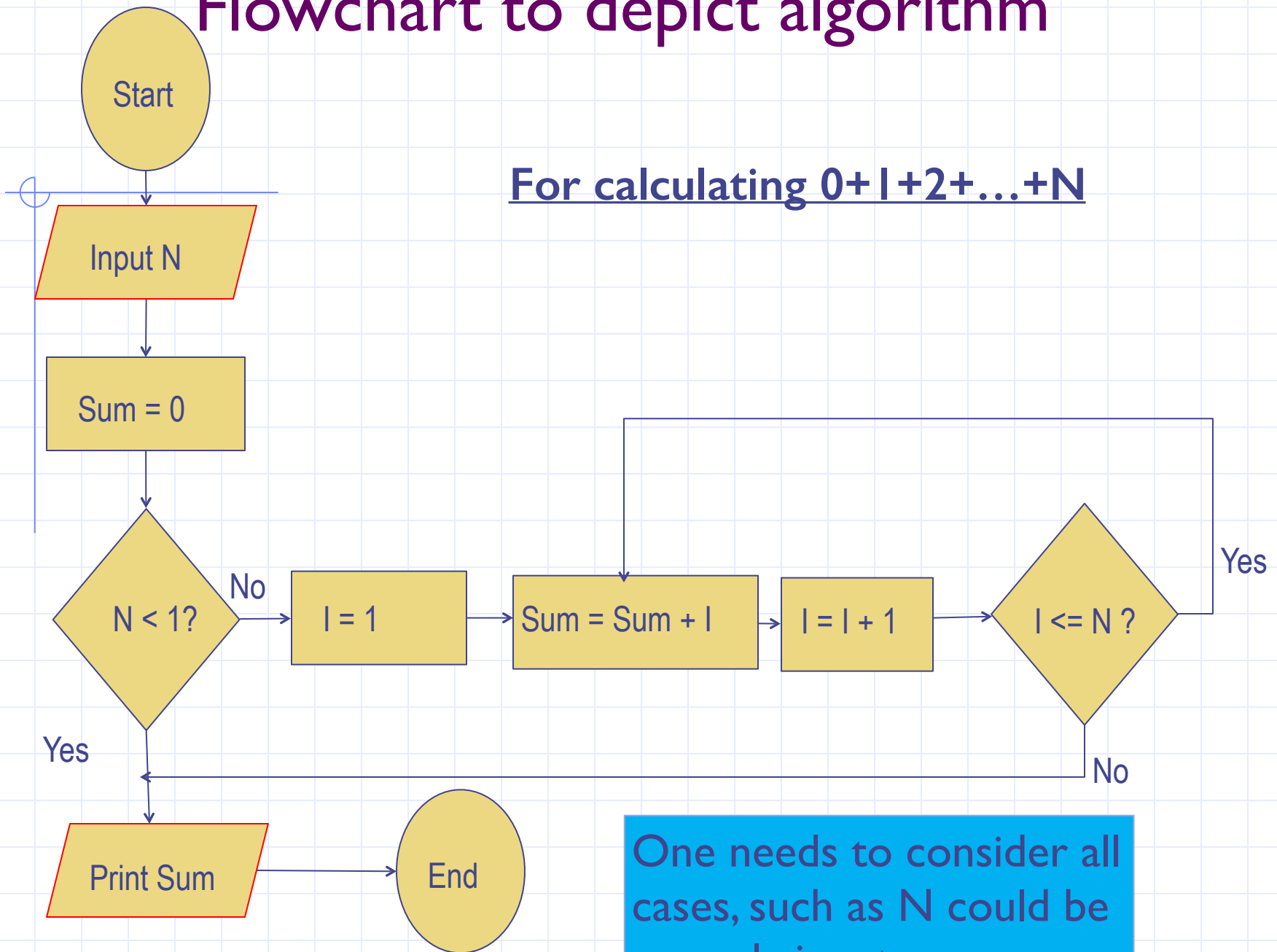
For calculating  $0+1+2+\dots+N$



Too Detailed? Computers need precise instructions

# Flowchart to depict algorithm

For calculating  $0+1+2+\dots+N$



One needs to consider all cases, such as N could be wrongly input



# What is “NOT” a computer

At least for this course...





# Some famous Computers



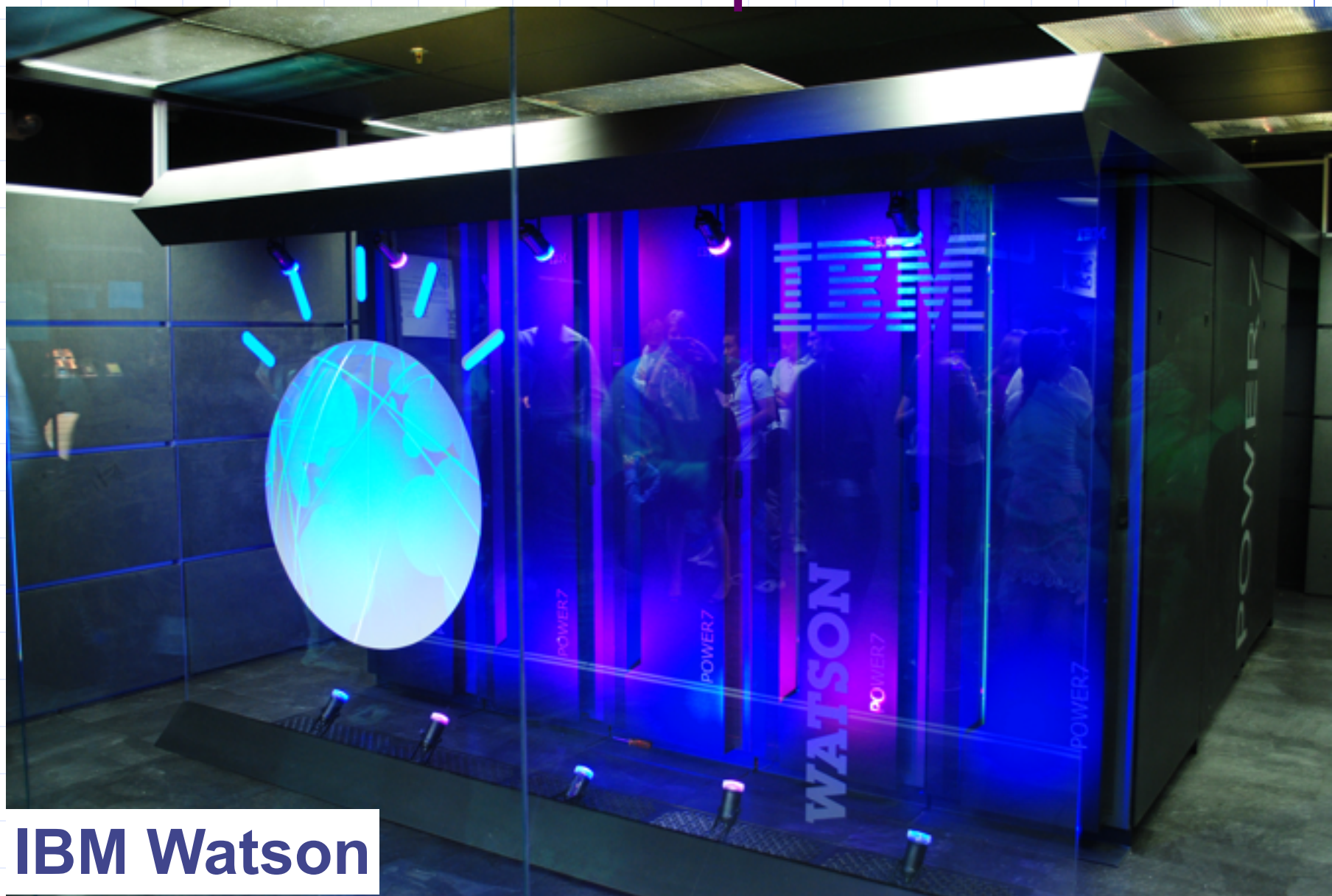
**IBM Deep Blue**

# Some famous Computers





# Some famous Computers



**IBM Watson**

# Google Alpha-Go



# Next Class



## Overview of Programming