ES112: Computing

24 Nov 2022

* All images from internet for educational purpose only

Quiz

Mahatma Gandhi, 1930

?, 1982

Greta Thunberg, 2019

Quiz

Mahatma Gandhi, 1930

?, 1982

Greta Thunberg, 2019

Computing Around Us

Computing Around Us

Input: Key press

Procedure/Sequence of Steps:
Update score, …,

Output: Update graphics, sound

Computing Around Us

Input: Key press

Procedure/Sequence of Steps:
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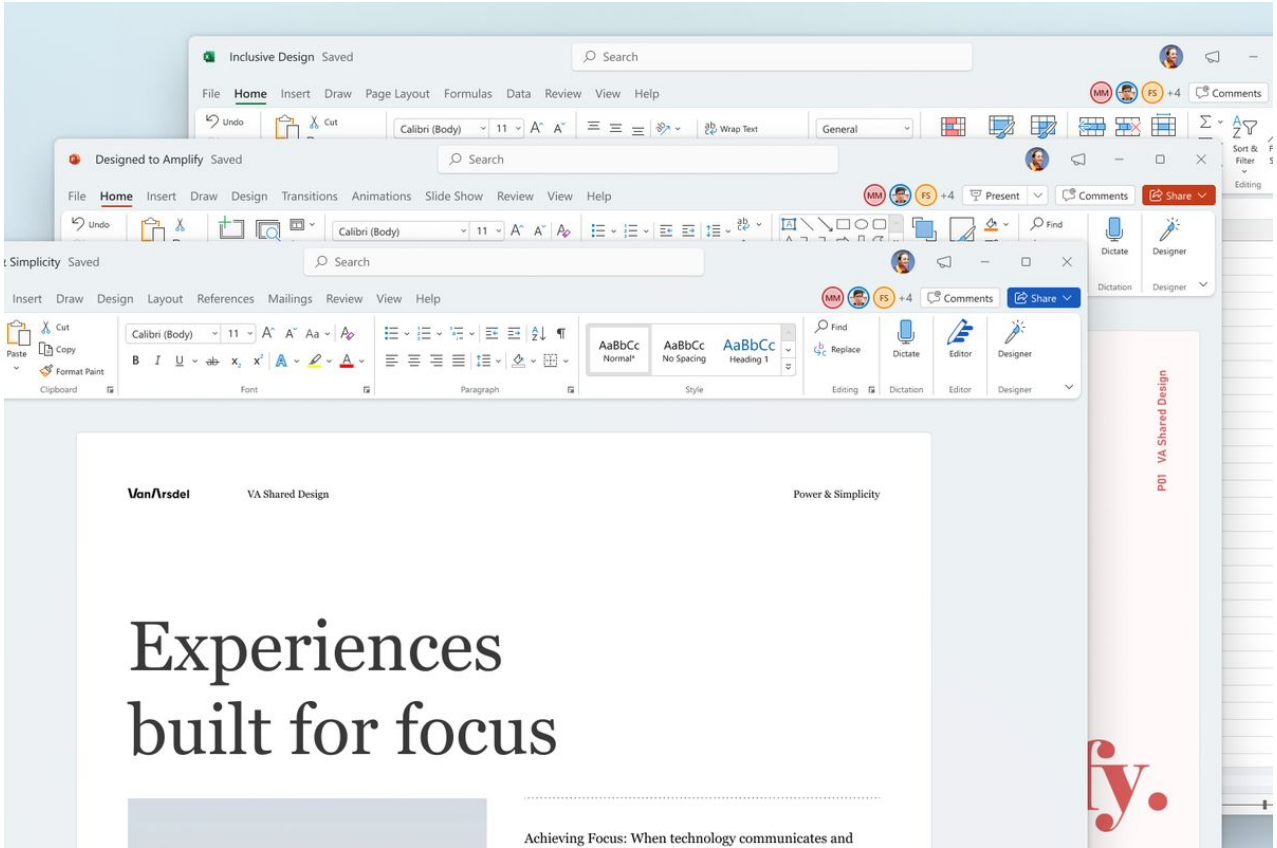
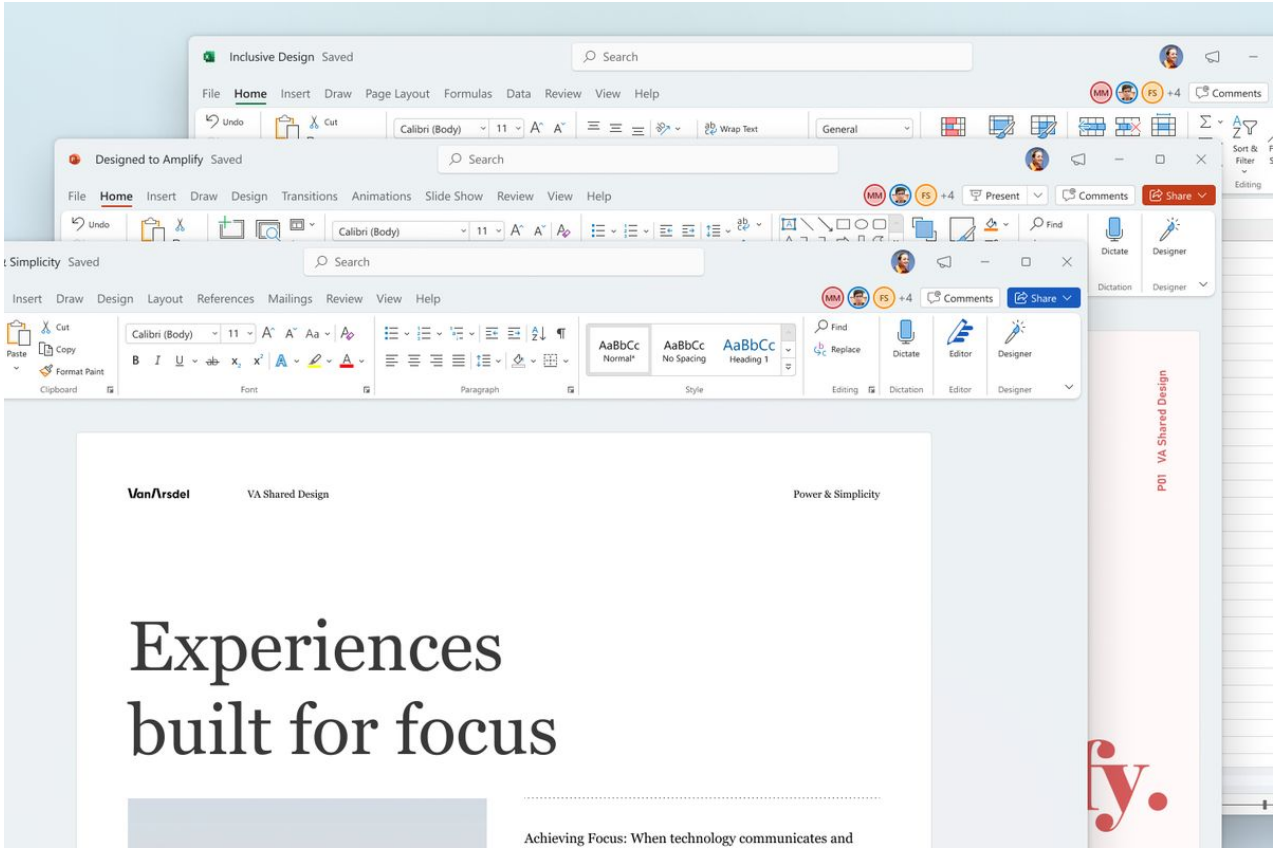
Pygame-snake demo

Computing Around Us

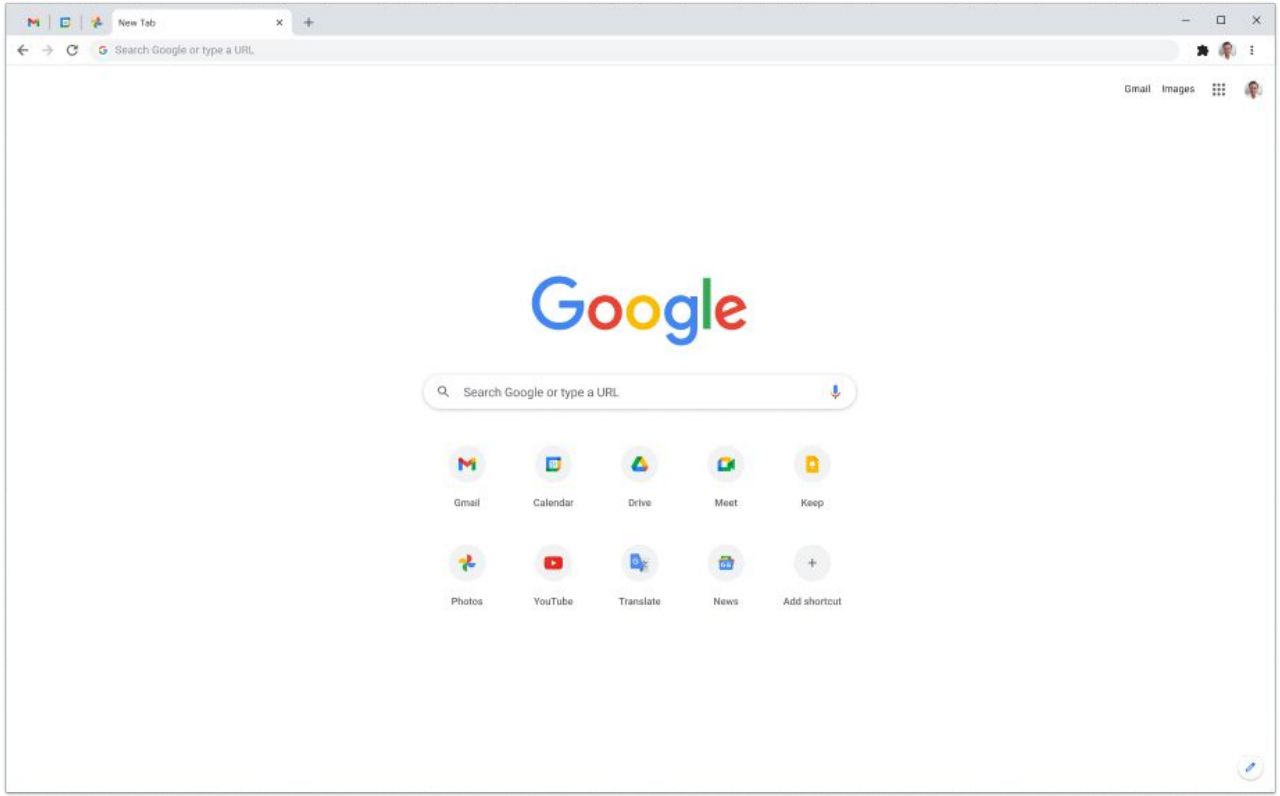


Computing Around Us



gui-temp demo

Computing Around Us



Data Analysis

data.ipynb demo

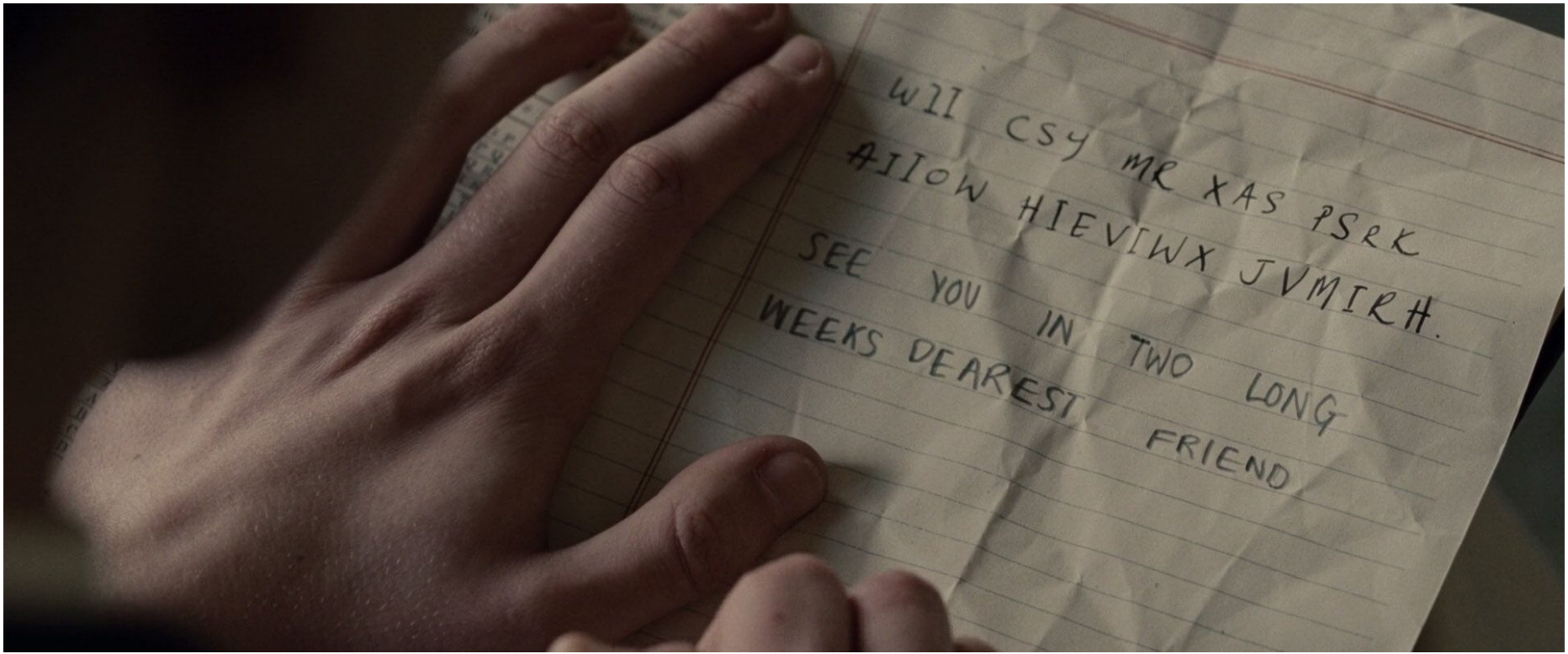
Generative Modelling

Computing Around Us

Computing Around Us

Computing Around Us

pythonchallenge



pythonchallenge

pythonchallenge

cipher.py demo

Euler

euler.py demo

Goals of this course

- Computational way of thinking (mostly organically)
- Programming in Python

Computational Thinking

- Decomposition
- Pattern Recognition
- Abstraction and Data Representation
- Algorithms

Computational Thinking : Decomposition

- Write an essay on your JEE experience in 5000 words

Computational Thinking : Decomposition

- Write an essay on your JEE experience in 5000 words
- Outline
  - Background till class 10th
  - Schooling and Subjects in Class XI and XII
  - …
  - …
  - …
  - Lessons

Computational Thinking : Pattern Recognition

- Assemble a piece of furniture

Computational Thinking : Pattern Recognition

- Assemble a piece of furniture
- First drawer is hard as you have never assembled a drawer before

Computational Thinking : Pattern Recognition

- Assemble a piece of furniture
- First drawer is hard as you have never assembled a drawer before
- Repeat
  - Take out unfinished drawer
  - Take out the screws
  - Put the screws …
  - Use the tools …

Computational Thinking : Pattern Recognition

- Add 1 + 2 + 3 + … + 100

Computational Thinking : Pattern Recognition

- Add 1 + 2 + 3 + … + 100
- = (1 + 100) + (2 + 99) + (3 + 98) + …
- Find the pattern and repeat and automate ...

Computational Thinking : Data Representation and Abstraction

- You all received your IITGn email IDs. What all information was sought?

Computational Thinking : Data Representation and Abstraction

- You all received your IITGn email IDs. What all information was sought?
- Name
- Roll Number
- ….

Computational Thinking : Data Representation and Abstraction

- You all received your IITGn email IDs. What all information was sought?
- Why not the following?
  - Favourite colour
  - Favourite dish
  - ….

Computational Thinking : Data Representation and Abstraction

- Let us say you are in third year and have to choose an elective course. How do you choose?

Computational Thinking : Data Representation and Abstraction

- Let us say you are in third year and have to choose an elective course. How do you choose?
  - Interest level
  - Easy/Difficult?
  - ….

Computational Thinking : Data Representation and Abstraction

- Let us say you are in third year and have to choose an elective course. How do you choose?
  - Interest level
  - Easy/Difficult?

Interest/Difficulty	Easy	Difficult
Boring	C1, C2	C3, C4
Interesting	C5, C6	C7, C8

Computational Thinking : Algorithms

- Sequence of “instructions”
- Brush your teeth
  - Open tap
  - Take out brush
  - Put x mg of paste on brush
  - …
  - ...

Computational Thinking : Algorithms

- But, if you have tooth ache you want to use a sensitive toothpaste
  - Open tap
  - Take out brush
  - Do you have toothache
    - Yes:
      - Take out sensitive toothpaste
    - No
      - Take out regular toothpaste
  - Pour x ml of toothpaste on to the brush
  - …
  - ...

Course Website Tour

- Link: https://nipunbatra.github.io/comp22/
- Please bookmark
- Tour:
  - Instructors and TAs
  - Section and Link
    - Recording
  - Class plan

Grading Policy

- Discuss from the website

Replit Tour

- Mainly used for announcements and record keeping

Repl.it

- Used as environment/website for:
  - Lecture programs
  - Assignments
  - Exams
- Demonstration:
  - Writing program in editor
  - Running program written above
  - Writing simple program in console/shell

Acknowledgements for materials

- https://computingbook.org/FullText.pdf
- https://cs.calvin.edu/activities/books/processing/text/01computing.pdf
- https://teachyourkidscode.com/what-is-computational-thinking/
- https://www.bbc.co.uk/bitesize/guides/zp92mp3/revision/2
- https://www.youtube.com/watch?v=d5nV8iz2vAk
- https://www.youtube.com/watch?v=b4a7Ty1TpKU