

ENGF0034: Design and Professional Skills

Introductory lecture



Prof. Martin Benning
30 September 2025

ENGF0034 2025/26 is a team effort



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And many more

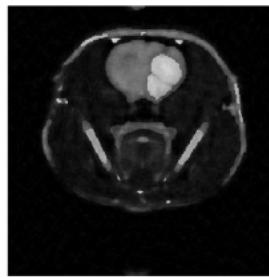
Who am I? Professor of Inverse Problems



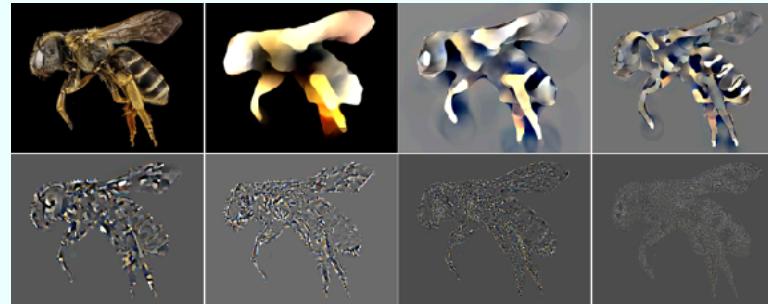
Martin Benning

Areas of expertise:

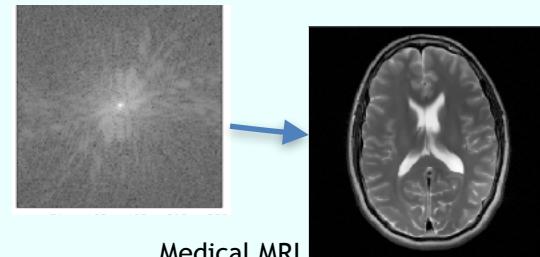
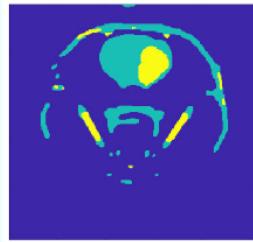
- Inverse & Ill-posed problems
- Regularisation theory
- Machine learning
- Optimisation
- Industrial & medical Imaging
- Image processing



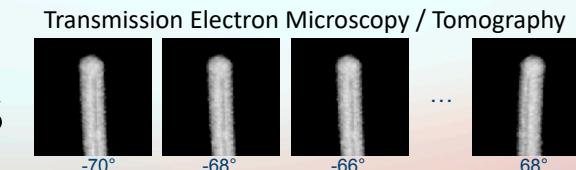
Joint reconstruction & segmentation



Nonlinear spectral decomposition



Medical MRI



Transmission Electron Microscopy / Tomography

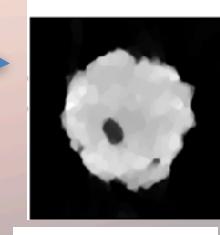
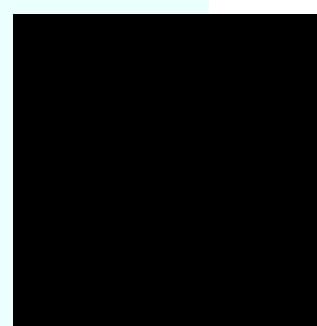
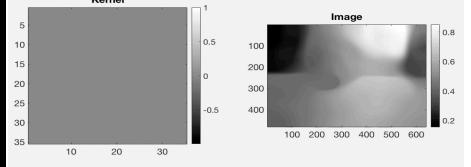


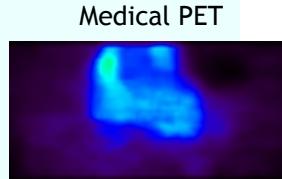
Image reconstruction



Blind image deconvolution



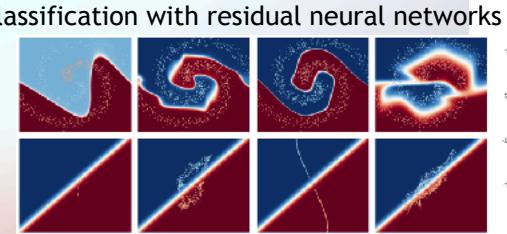
Industrial MRI



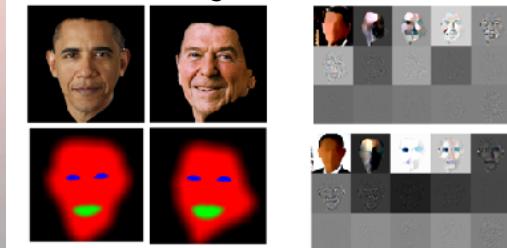
Medical PET



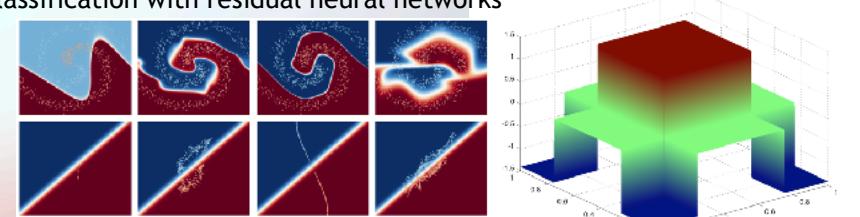
Nonlinear eigenfunctions



Nonlinear image fusion

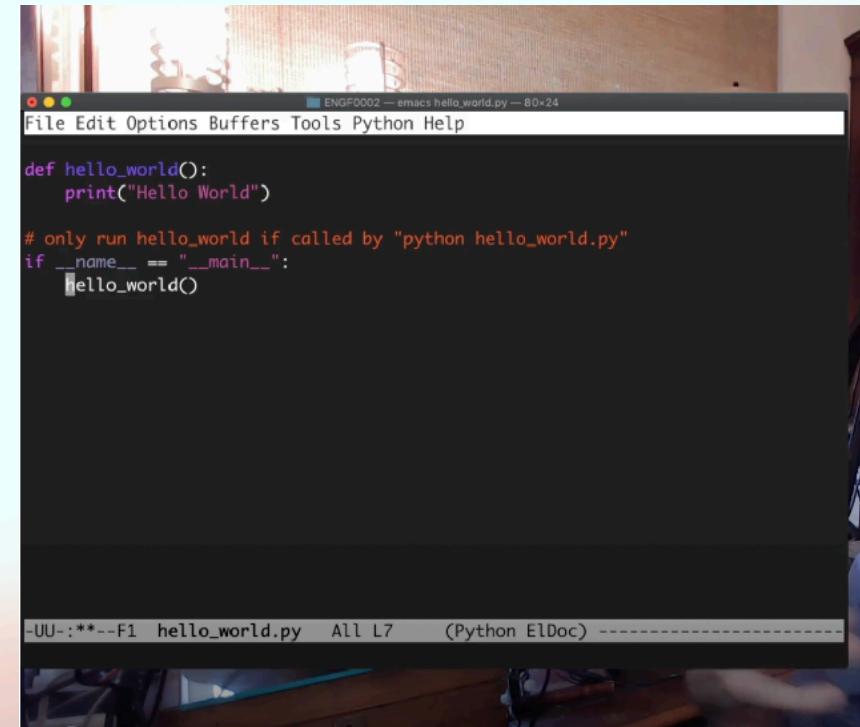


Classification with residual neural networks



Module approach

- Lectures (almost) every **Tuesday**
- Tutorials (almost) every **Friday**
- **Ask and answer questions** via the Moodle forum
- Course materials will be released via [git](#)
- Assessments will be released via [Github Classroom](#)
(or Moodle)
- Drop-in clinics will take place as extra support for
those new to programming



```
ENG0002 - emacs hello_world.py -- 80x24
File Edit Options Buffers Tools Python Help

def hello_world():
    print("Hello World")

# only run hello_world if called by "python hello_world.py"
if __name__ == "__main__":
    hello_world()

-UU-:***-F1  hello_world.py  All L7  (Python ElDoc) -----
```

Let us checkout the module [Moodle](#) & [git](#) pages

Assignments

- Week 1 - 2: Introductory programming assignment
- Week 2 - 3: Debug the bomber game
- Week 3 - 5: Debug the frogger game
- Week 5 - 7: Write a tetris autoplayer (20%)
- Week 7 - 9: Write pacman protocol specification (15%)
- Week 7 - March 22 in Term 2: Ethics report (15%)
- Term 2 Reading Week: Presentations (10%)
- + Scenario assessments in Term 2 (remaining 40%)

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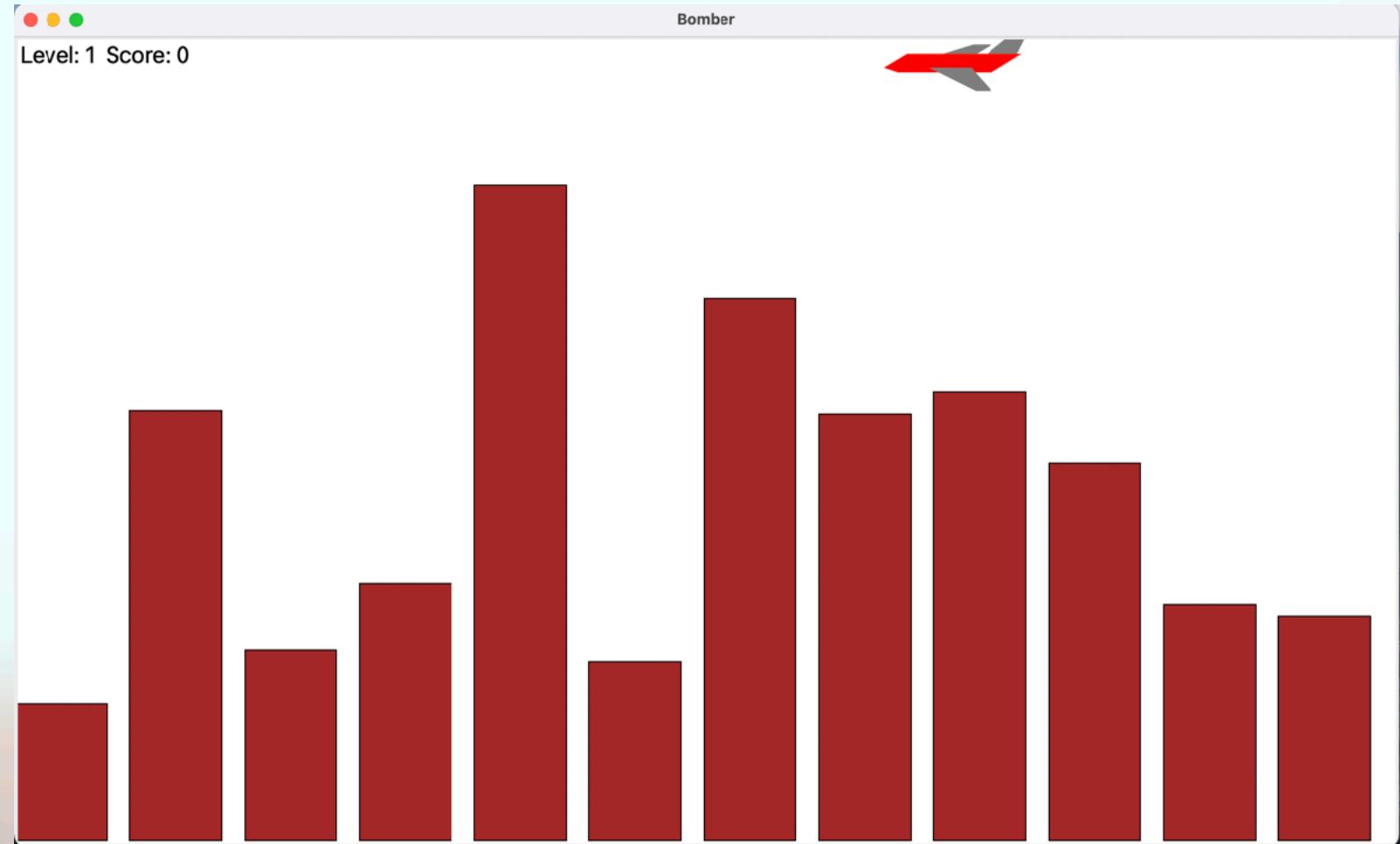
Do not plan time away
during reading week!

Assignments

Assignment 2: (Canyon) Bomber

Classic Atari Arcade Game from 1977

Task: Find five bugs that make the game unplayable, and fix them!

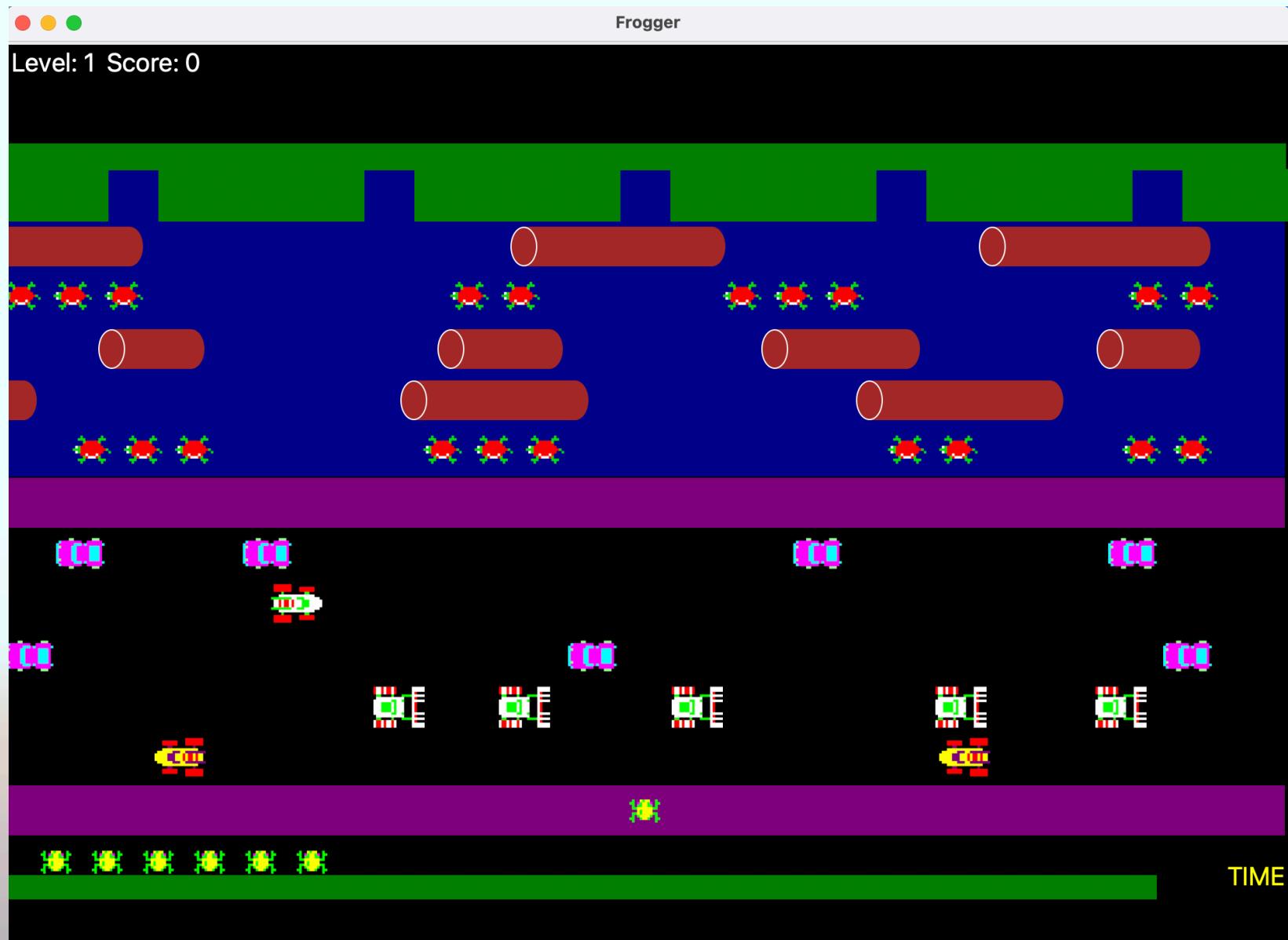


Assignments

Assignment 3: Frogger

Classic Konami/Sega Arcade
Game from 1981

Task: Find five bugs that make
the game unplayable, and fix
them!



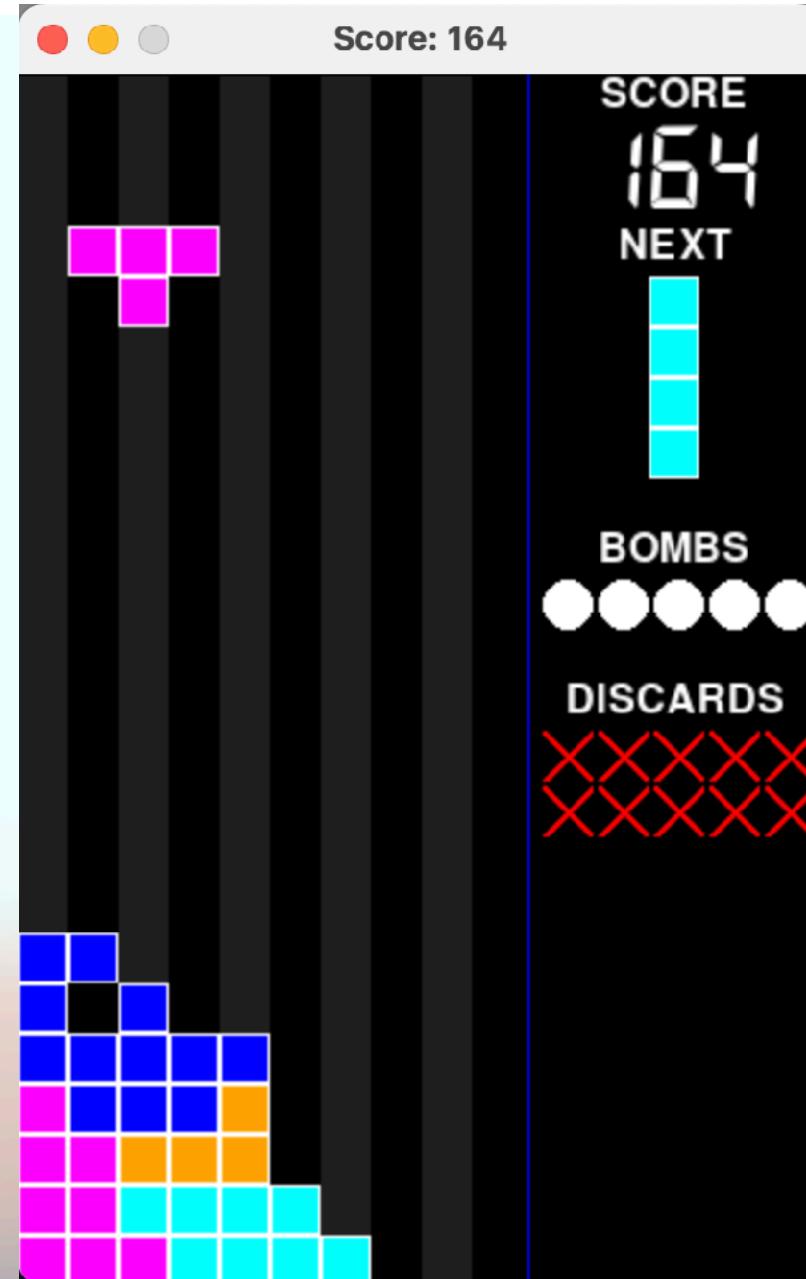
Assignments

Assignment 4: Tetris autoplayer

Puzzle video game created by Alexey Pajitnov in 1985

Game Boy version by Nintendo popularised Tetris in 1989

Task: write a program that plays Tetris and compete with your peers



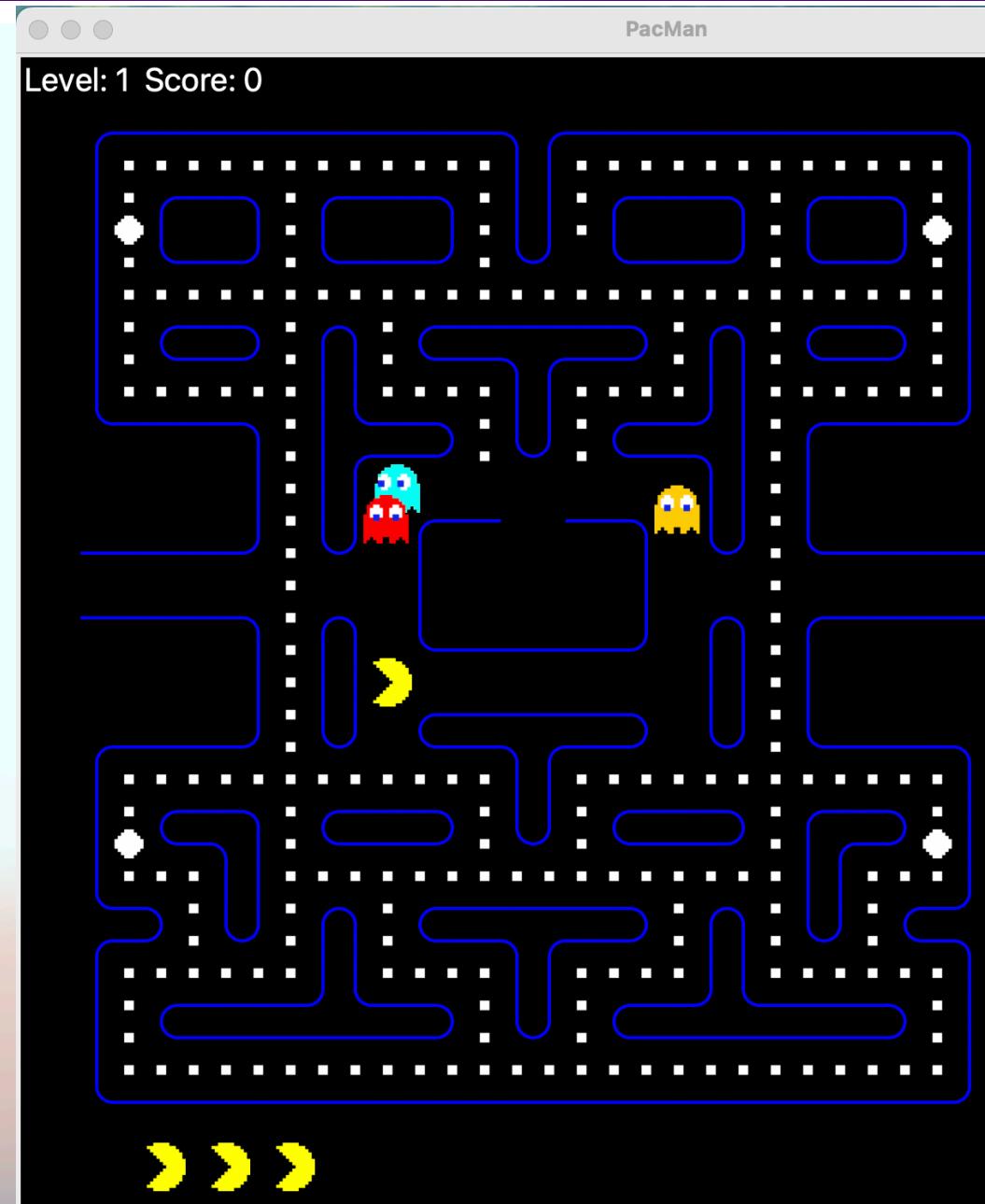
Assignments

Assignment 5:
Write specification
for Pacman game

1980 Maze video game

Special network version of the game

Task: write a better
network protocol
specification for this game



Other remarks

- For assessments 1 - 3 communicate and work with your peers
- If you have questions, it is likely your peers will have similar questions → ask via Moodle forum, **not** via e-mail
- Do not only use forum when you have questions; help your peers and answer their questions, too!
- However, do not ask or post solutions for summative (marked) assessments (4 & 5) → punishable offence
- Make use of forum and the drop-in clinics; do not suffer in silence!
- I know it is tempting to use Large Language Models (like ChatGPT, Gemini, Claude etc.), but there are risks:
 - Often you require programming experience to understand LLM outputs
 - More importantly, you require experience to identify **wrong** outputs!
 - It is not allowed to use LLMs for summative (marked) assessments!

This Friday (October 4)

Pebble in the pond!



When? 11 am - 1 pm

Where?

Holiday Inn Bloomsbury,
Booker and Turner Suite

Next Tuesday (October 7)

Teamwork - Live Session

with Dr Fiona Truscott



When? 11 am - 1 pm

Where?

Roberts G06

Now / Next hour ➔ Programming foundations!