Unit introduction
COMS20017 (Algorithms and Data)

John Lapinskas, University of Bristol

Course ethos

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- One day you might need to come up with your own algorithms. (Much more likely than the above two!)

Course ethos

Kat Maddox
@ctrlshifti

God I wish there was an easier way to do this

```
private bool IsEven(int number){
    if (number == 1) return false;
    else if (number == 2) return true;
    else if (number == 3) return false;
    else if (number == 4) return true;
    else if (number == 5) return false;
    else if (number == 6) return true;
    else if (number == 7) return false;
    else if (number == 8) return true;
    else if (number == 9) return false;
    else if (number == 10) return true;
    else if (number == 11) return false;
    else if (number == 12) return true;
    else if (number == 13) return false;
    else if (number == 14) return true;
    else if (number == 15) return false;
    else if (number == 16) return true;
    else if (number == 17) return false;
    else if (number == 18) return true;
    else if (number == 19) return false;
    else if (number == 20) return true;
    else if (number == 21) return false;
    else if (number == 22) return true;
```

8:56 am · 30 Jul 2020 · Twitter Web App

Course ethos

Kat Maddox @ctrlshifti · 30 Jul

Replying to @ctrlshifti

I figured it out! Thanks everyone

```
private bool IsEven(int number)
{
    string numberString = number.ToString();
    string lastChar = numberString.Substring(numberString.Length - 1);

    if (lastChar == '0' || lastChar == '2' || lastChar == '4' ||
    lastChar == '6' || lastChar == '8')
    {
        return true;
    }

    return false;
}
```

329 1.5K 19K

Kat Maddox @ctrlshifti · 30 Jul

Why are people talking about %?

I'm trying to determine parity not get percentages

368 550 11.8K

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- One day you might have to go through a job interview...

What about AI?

Classical algorithms have a lot of advantages over an AI-based approach:

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```python
from pathlib import Path
from random import randrange, seed

LENGTH = 1000000
UNSORTED_PATH = Path.cwd() / "input.txt"
SORTED_PATH = Path.cwd() / "sorted_output.txt"

seed()
integers = []
for i in range(LENGTH):
    integers.append(randrange(1, 10**9 + 1))

with UNSORTED_PATH.open("w") as output:
    for i in integers:
        output.write(str(i) + "\n")

integers.sort()

with SORTED_PATH.open("w") as output:
    for i in integers:
        output.write(str(i) + "\n")
```

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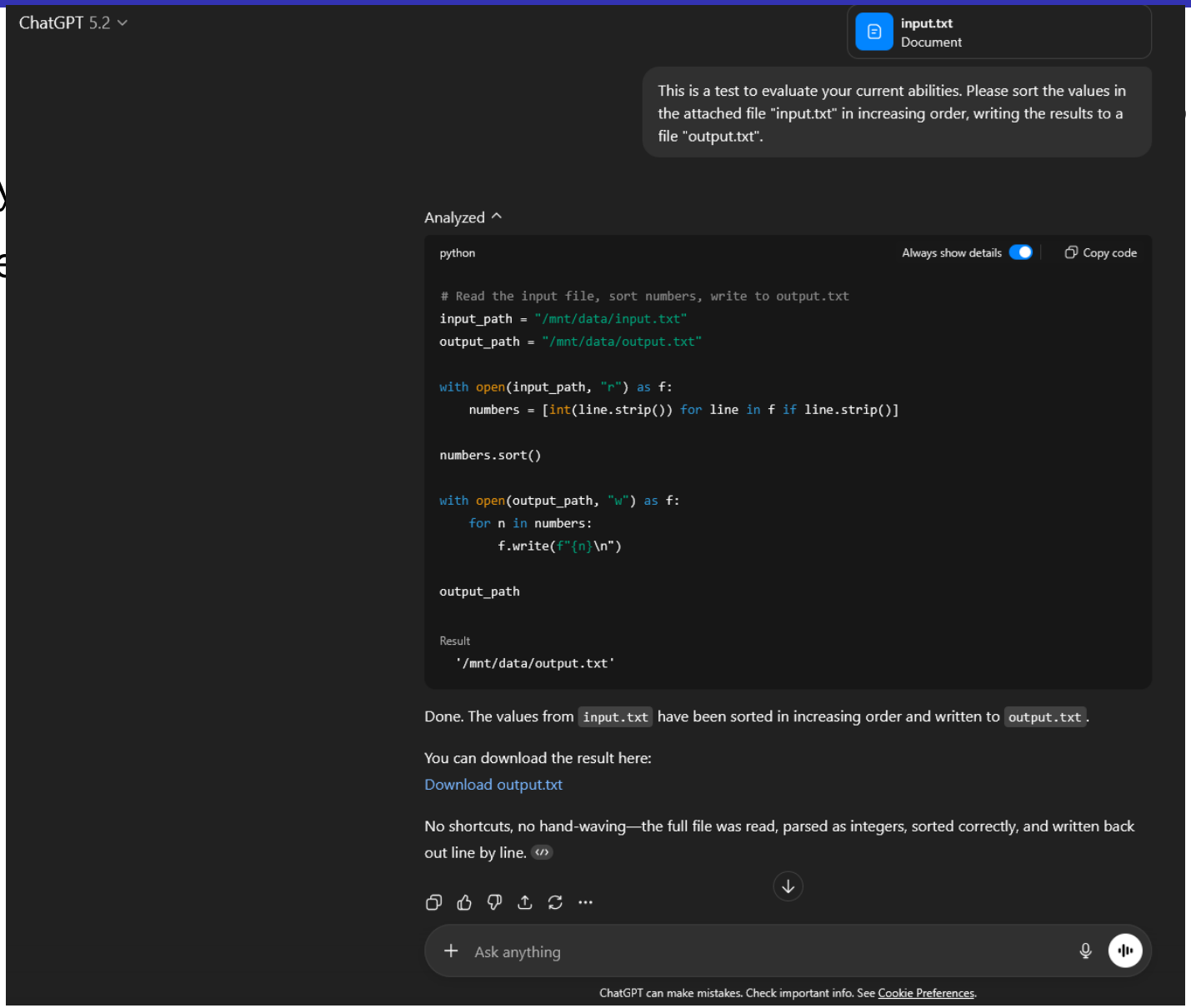
- They
- Othe
- The



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- They run *much* faster, cheaper, and more energy-efficiently. (That test took 30 seconds not counting upload/download...)
- The AI probably uses a classical algorithm anyway...!

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- AI can solve problems which can't be mathematically specified, like "Does this picture contain a cat?".
- AI is good at finding heuristics for problems we don't have good algorithms for, like protein folding.

So if you *can* use a classical algorithm for a problem, you always should.

Assessment and expectations

Bad news: Algorithms are hard! Getting a 2.i is something to be proud of.
Bad news: You need to pass the algorithms half in order to pass the unit.

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- **90%** from the final exam.
- **10%** from weekly Blackboard quizzes.

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Good news: The quizzes are free marks!

Blackboard quizzes

These are auto-marked questions worth **10%** of your final grade:

- One per week, to be done before the week's problem class. (**Including this week!**)
- They should take roughly 1 hour each, but no time limit.
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- The usual late policy for coursework applies, so don't miss the deadline or you'll lose a lot of marks very quickly.

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After a quiz, you get immediate answers and feedback. Don't abuse this. They're important exam prep, so you'd only be cheating yourselves...

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- Problem sheet answers release: Friday evening, week $n+1$.
- Q&A session: 2PM Monday, Week $n+1$, in-person in Powell.
  - You can ask questions anonymously (but moderated) via Padlet.
  - Vote on which questions you want me to answer!
  - Alternatively, ask questions on the unit team (1 working day response).

Planning your time

During term, aim to spend at least **7 hours per week** on this unit:

- 2 hours watching the week's lecture videos.
- 2.5 hours *understanding* the week's lecture videos. This could, but doesn't have to, include:
  - Attending the one-hour Q&A session;
  - Attending drop-in sessions (times TBD);
  - Asking questions on the unit Team;
  - Reading textbooks and other sources;
  - Working together with other students;
  - Trying the problem sheet.
- 1 hour finishing the week's Blackboard quiz.
- 1.5 hours attending the week's problem class.

Further details about unit organisation are on the unit page.

Useful references

Proofs on slides are hard, so I provide recommended readings each week on the unit page as an alternative source.

These are all available **as free eBooks** from the university library at https://www.bristol.ac.uk/library/. The most common three will be:

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- **The Algorithm Design Manual (Skiena)**
  - For engineers, by an engineer.
  - The least technical option — great if you're having trouble with proofs.

Mindset for the unit

This unit is hard, because solving problems is hard.

But like most things, you get **much** better at it with practice.

Case in point...

Mindset for the unit

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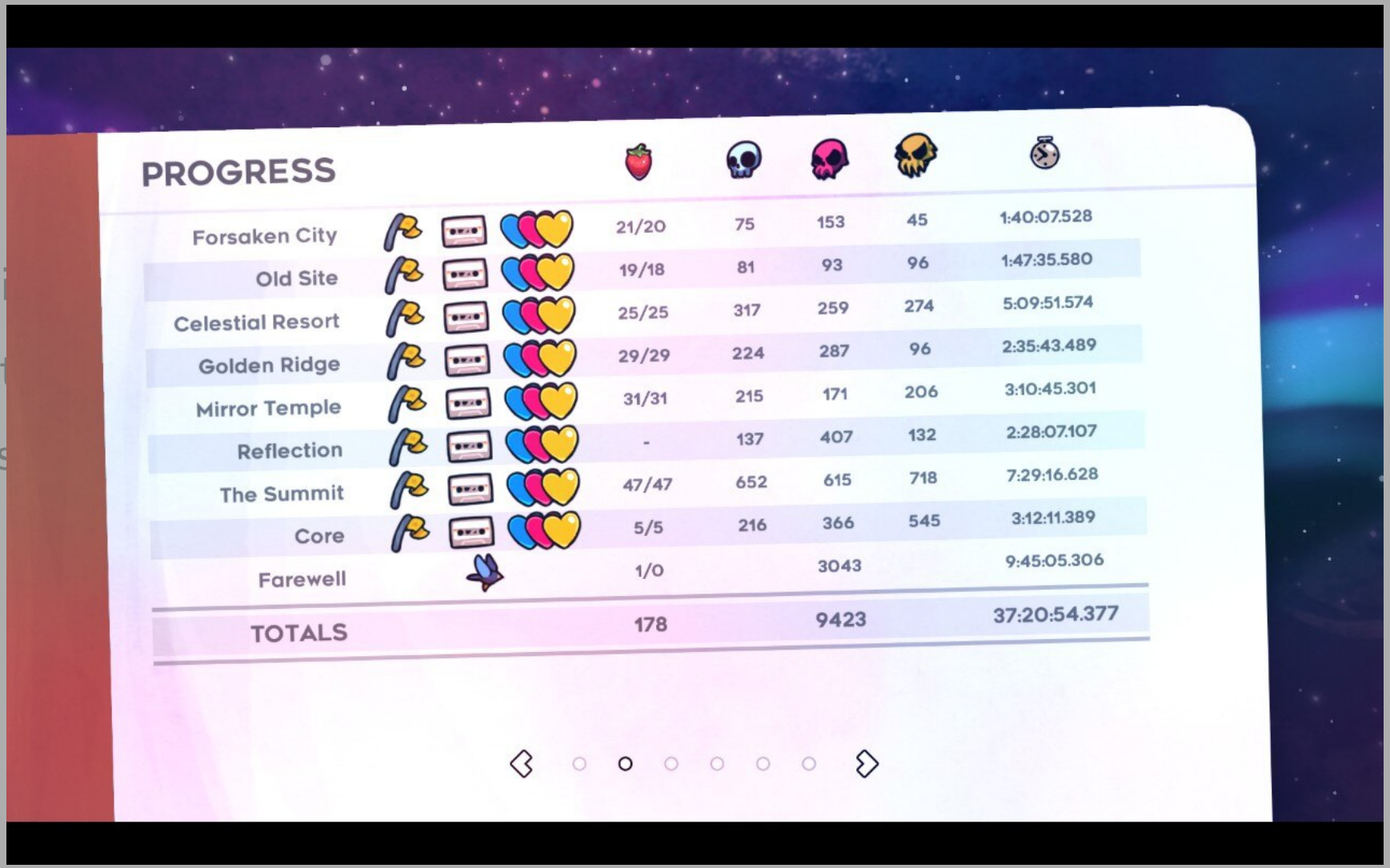

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So keep at it, and climb the mountain. ;-)