Computer Science

An introduction

Backpack problem

£5 — 5 KG
£8 — 10 KG
£12 — 8 KG
£10 — 12 KG
£3 — 3 KG
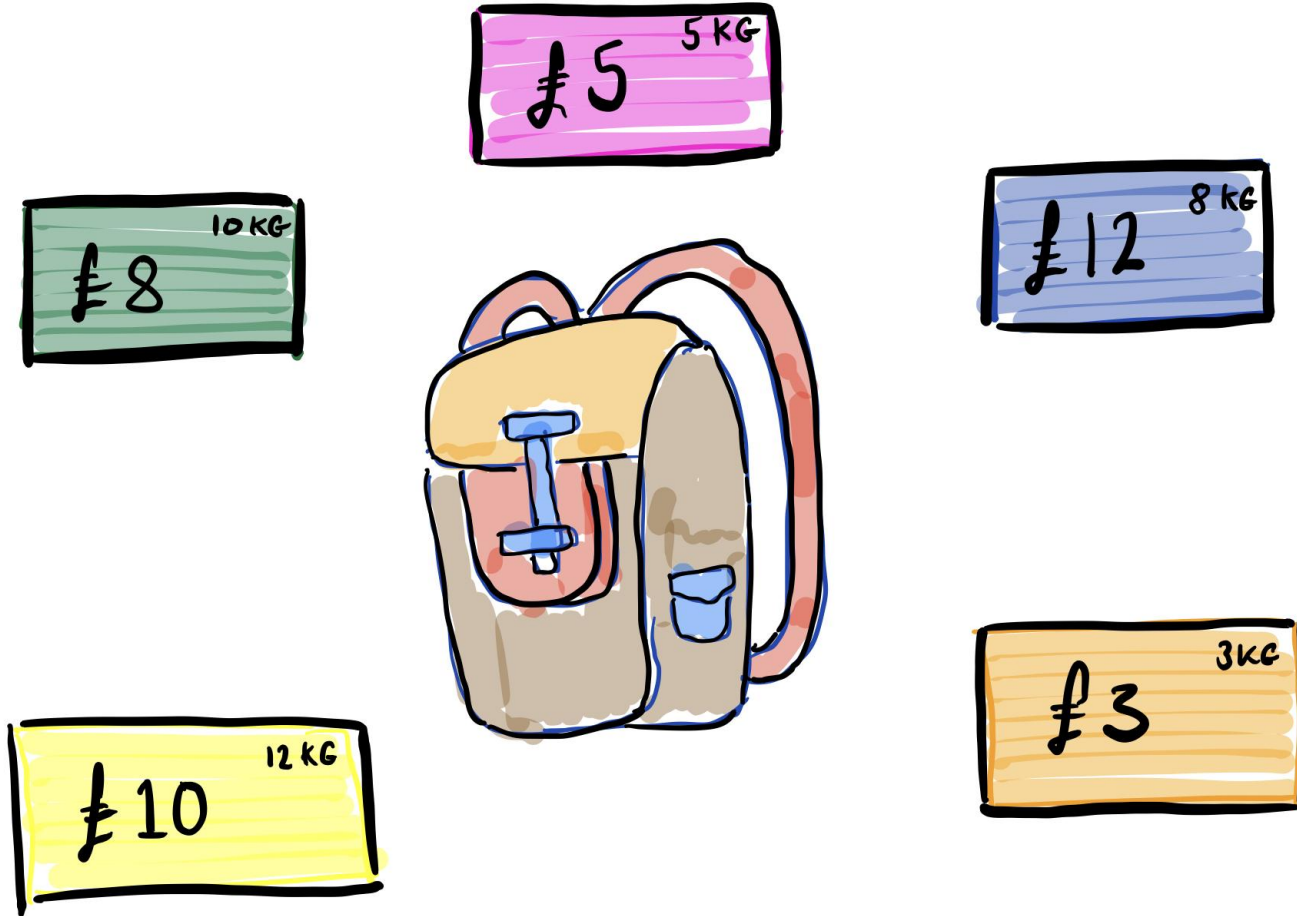
Max weight **20kg**

What is the greatest value (£) that can be made?

Boxes may be used **multiple times**

Computational Thinking

Decomposition

Break down the problem into smaller tasks

Pattern Recognition

Identify similarities, differences, and patterns within the problem

Abstraction

Identify general principles and filter out unnecessary information

Algorithm Design

Identify and organize the steps needed to solve the problem

Algorithms are everywhere

- Cars
- Heating controls
- Social media feeds
- Search engines
- Sat nav
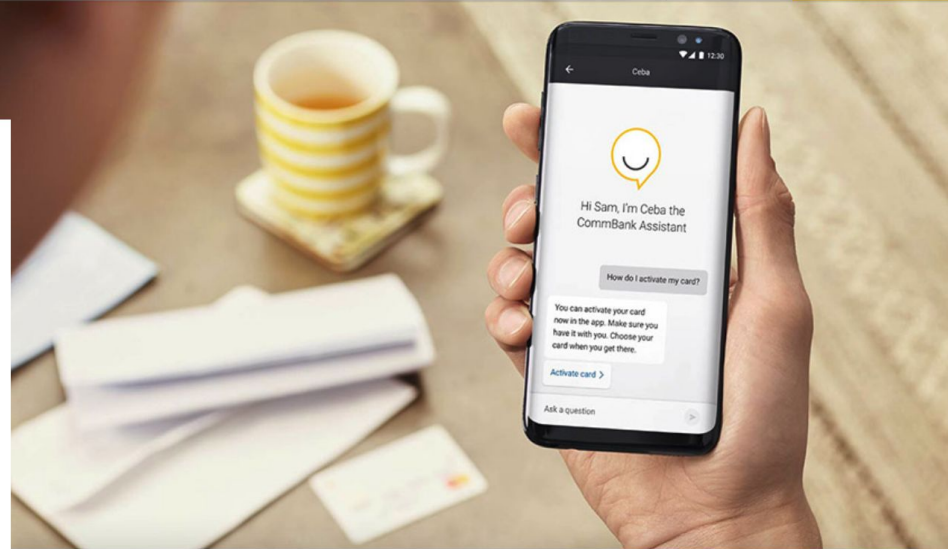- Music recommendations
- Helping judges sentence criminals

UCSF Medical Center Opens Robotic Pharmacy to Improve Patient Safety

Log on
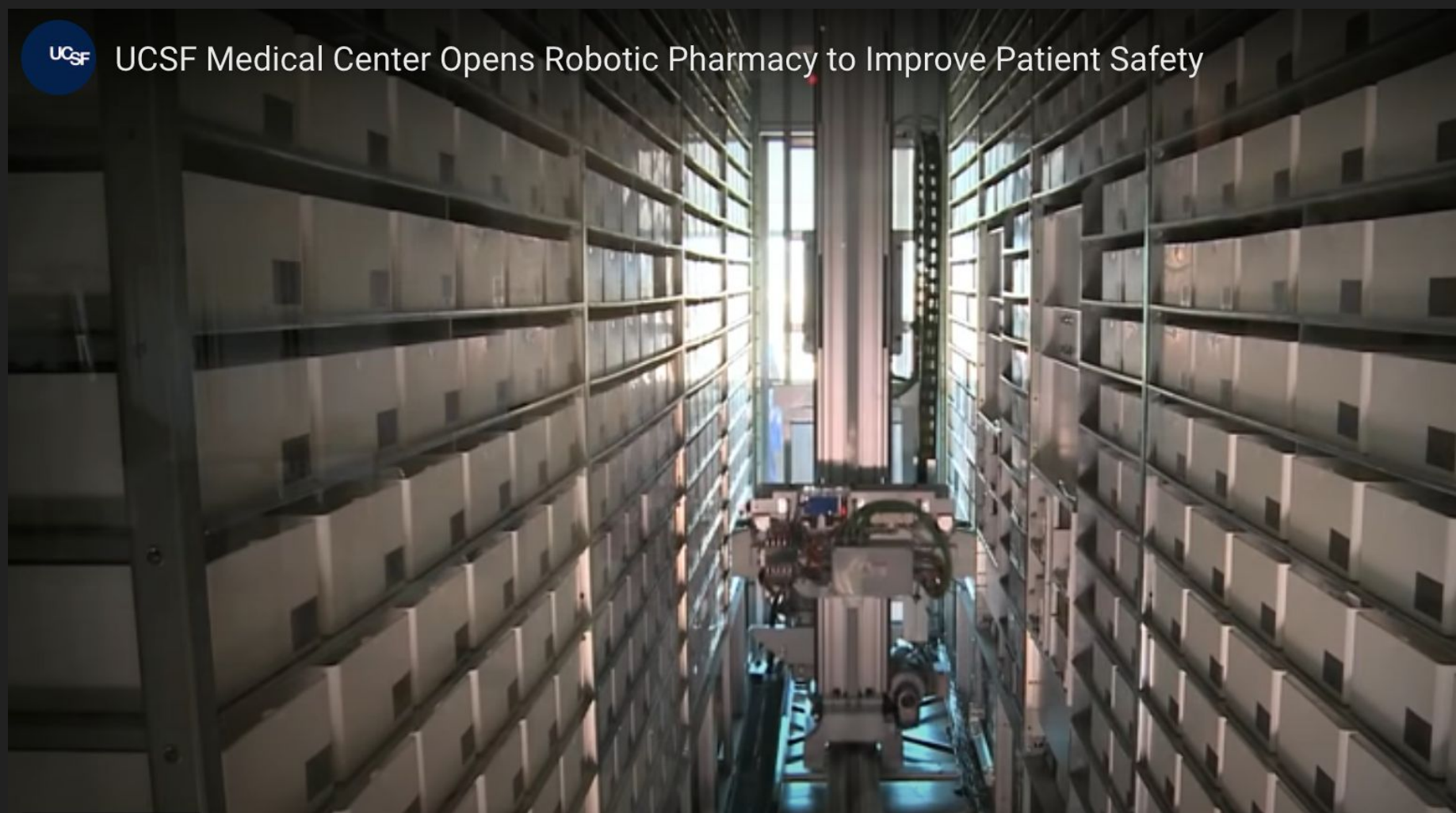
Chat to Ceba

Meet Ceba. Your digital banking assistant who is here to answer your day-to-day banking questions any time, day or night.

What is Ceba?

Ceba (see-bah) is your virtual banking assistant who can answer a range of day-to-day banking questions and provide you with helpful info.

A sophisticated chatbot trained to give you in-the-moment, digital support. Not to be confused with our messaging or live chat support, where you have an online conversation with one of our CommBank humans.

'Enthralling' *OBSERVER*   'Spellbinding' *FINANCIAL TIMES*

MICHAEL LEWIS

FLASHBOYS

CRACKING THE MONEY CODE

'The greatest story of our age ... Be very afraid'
SUNDAY TIMES

Algo trading

What is the Reddit Algorithm?

Reddit uses a story algorithm, meaning the number of votes and submission time of links have the biggest impact on how stories rank on the platform.

Also ranks items by the number of votes accumulated, as well as the age of the post compared to others.

Making the front page always appear fresh to a new user.

Reddit algorithms are written in Python

How the TikTok algorithm works

It serves users posts they engage with…

The **strongest** ranking indicator in this category, however, is the **video completion rate.**

It is more likely to push content that a user explores so more likely to see videos with the same hashtag and sound.

users' location, language preference, and device type also play a role

Question

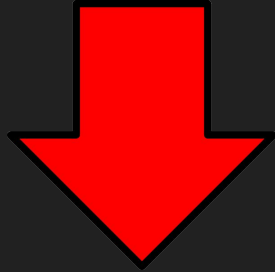During an average day, what is your interaction with algorithms?

Apply. block vs text based coding
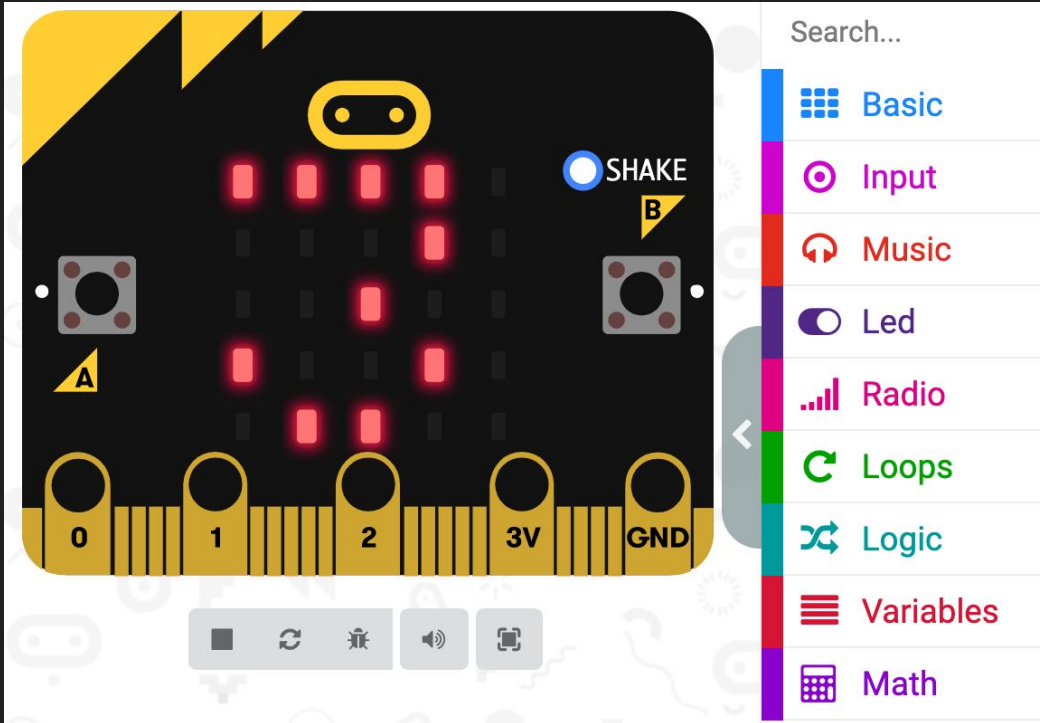
Levels of abstraction

High-level languages

Binary patterns (0101000101001) known as machine code

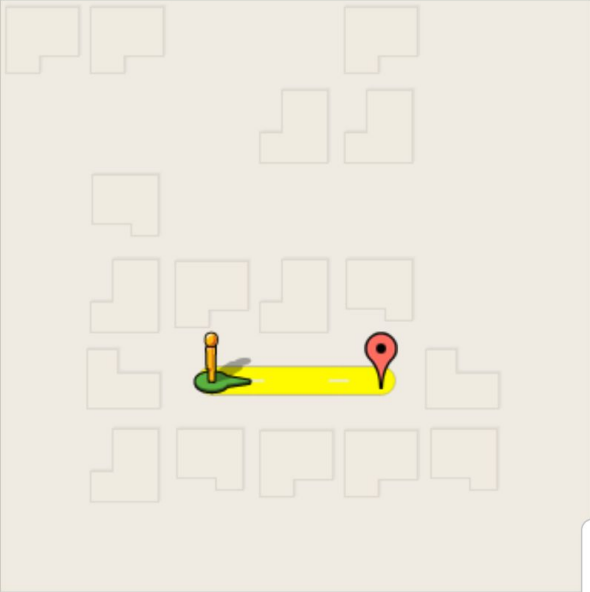# Key terminology and concepts

Command or statement

Sequence

Selection (branching)

Iteration

Bug testing

Search "blockly games maze"

bug

Challenge 10 solution

wash-up

- Computer Science is most commonly taken at A-Level with Physics, Mathematics, Further Mathematics and Economics

- Algorithms are ubiquitous, influential and demand ethical debate

- High-level languages, whether Block, Python or C allow us to focus more on the computation - abstracting the low level working

- Finally remember, be careful naming things, did Grace Hooper think a dead moth shorting a relay in 1971 would be used by millions of programmers 50 years later?

Writing a function in python*

*If time permits

Function in Python

```python
# simple function, takes in side length as input

def areaOfASquare(side):
    return side*side

# call and use function, printing result to screen

print(areaOfASquare(10))
```