Intro to Ranges and Loops
Day 4 – PH 365

7 Oct 2024

Concept of Loops

Telling a computer to do the same action over and over again

If your computer is your sous chef, you want it to be able to handle doing many things repetitively

Structure of Loops

Loops are written like this in code:

```
Start with a bag of onions

For each onion in the bag:
    Put it on the cutting board
    Slice it up
    Put the slices into a saucepan

Cook up your onions
```
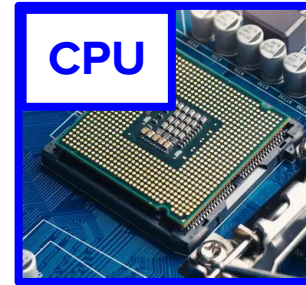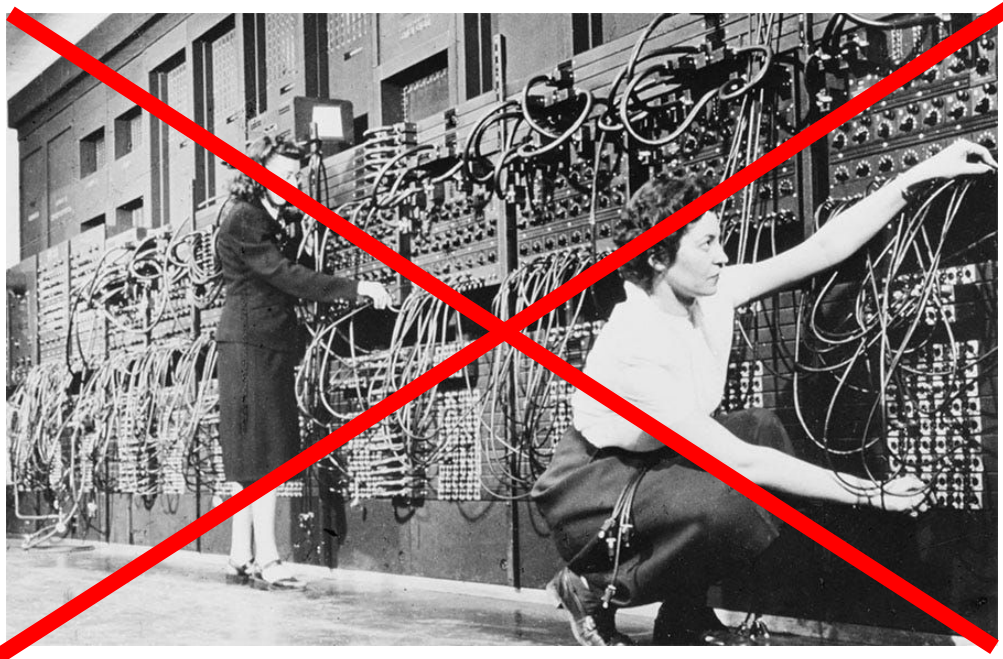
CPU

Instructions (code)

Computer returns to the top of the loop until it's done

The First Loops

Somehow **not** ENIAC!

The First Loops

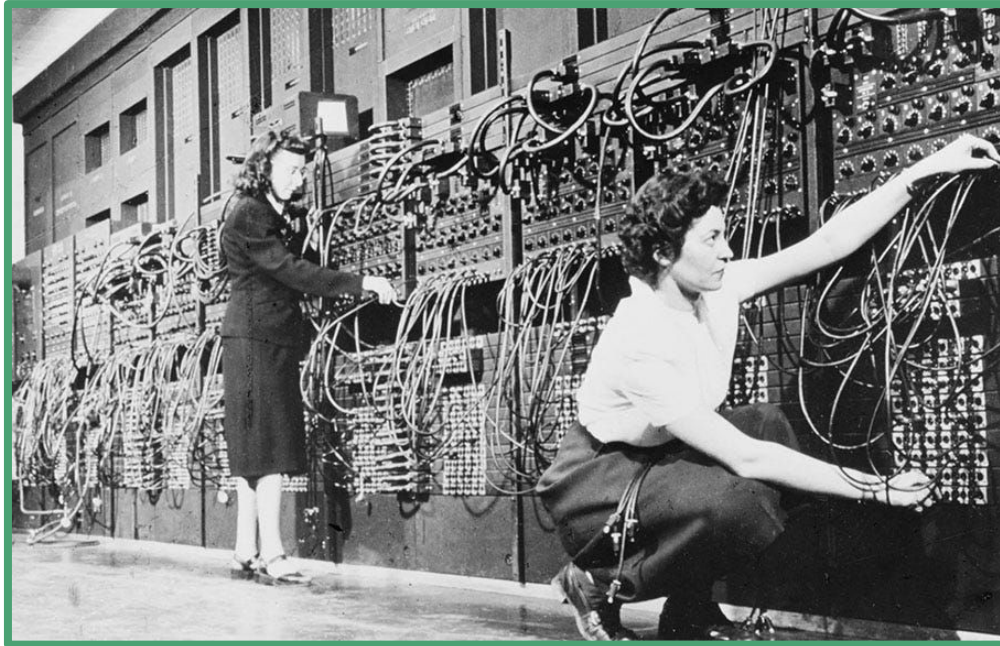Ada Lovelace, English mathematician, 1843

She invented loops to write a program to calculate Bernoulli numbers for Charles Babbage's theoretical machine, the "Analytic Engine"

The machine was never built…

The First Loops (used in a computer)

The first loops **to physically be used in a computer**... were in ENIAC :)

The `range` function and loop syntax

range: creates a sequence of numbers (can be used as indices)

Loop has a hidden line of code: **i = {next number in range(5)}**

```python
onions = ["red onion", "white onion", "yellow onion", "shallot", "scallion"]

for i in range(5):
    print(i, onions[i])
```

Computer returns to the top of the loop <u>until it's done</u>

```
0 red onion
1 white onion
2 yellow onion
3 shallot
4 scallion
```