Global Challenge

Fitness Friend

Lesson 2
Why is regular exercise important to prevent heart disease?

- keeps your heart healthy & increases fitness (can reduce coronary heart disease by 35%)
  - makes heart and blood circulatory system more efficient
- lowers your cholesterol level
- keeps blood pressure at healthy level
- can help to manage weight (another risk factor for heart disease)
We need to:

- design a **Fitness Friend:**
  - a wearable device that will give an audio and visual reminder every 25 minutes to do some exercise.
Pomodoro Technique

- Developed by Italian Francesco Cirillo
- Means tomato (traditionally uses a tomato timer!)
- Uses a timer to break work into intervals to help concentration (usually 25 minutes)
- Also ideal to remind you to move regularly!
Decomposition

- breaking down a complex problem into smaller, component parts.

Algorithm

- a sequence of instructions or rules to solve a problem
- written for a person to follow to write code
Learning objectives:

● To decompose a large problem into smaller, component parts
● To write a detailed, accurate algorithm using pseudocode and flowcharts
● To test and debug algorithms and understand why this is important
● To know what the ‘pomodoro technique’ is and that it can be helpful for health and concentration.
We need to:

● design a **Fitness Friend:**
  ○ a wearable device that will give an audio and visual reminder every 25 minutes to do some exercise.
Fitness friend basic algorithm

- Start
- Count 25 minutes
- Make audio sound
- Display visual message
- Repeat until stop
Pseudocode

- A simple way of describing a set of instructions (an algorithm)
- No specific syntax (programming language)
Fitness friend pseudocode algorithm 1

● **START**
● **REPEAT**
  ○ Count 25 minutes (1500000 seconds)
  ○ OUTPUT audio beep for 1 second
  ○ OUTPUT visual display ‘Move!’
● **STOP**

What is the problem with this algorithm?
We do not tell it how many times to repeat, or when to stop.
Fitness friend pseudocode algorithm 2

● When START button pressed
  ○ REPEAT until STOP button pressed
    ■ Count 25 minutes (1500000 seconds)
    ■ OUTPUT audio beep for 1 second
    ■ OUTPUT visual display ‘Move!’
● When STOP button pressed, STOP
Input device
● hardware that sends data to a computer system

Output device
● hardware that communicates the results of processed data from a computer system to the outside world
Iteration

● The repetition of a sequence

Loops

● A form of iteration
  ○ repeat until a certain condition is met
Flowchart symbols

- Start / Stop
- Process
- Input / Output
- Decision

Direction of flow
Fitness friend flowchart

- When START button pressed:
  - REPEAT
    - Count 25 minutes (1500000 seconds)
    - OUTPUT audio beep for 1 second
    - OUTPUT visual display ‘Move!’
- When STOP button pressed, STOP.
Wrap up questions:

- How have you used decomposition today?
- Why have we spent time designing algorithms today before starting to code?
- How have you used iteration and loops?
- How will pseudocode and/or flowcharts help you code?
- Why has it been helpful to test and revise the algorithms today?
- How can the pomodoro technique be helpful?
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