Overview

This exercise aims to teach children a quick introduction to Amdahl's law, a law that helps define the overall speedup of an algorithm/process by parallelising parts of the process. The formula can be given as 1/1-f, where f is the fraction of the program that has been sped up. In practice, Amdahl's law provides an estimate of the overall speed at which the algorithm can be executed.

Suitable For

This is the version of the exercise that is suitable for primary school children, roughly age 8 and up.

Key Concepts

Amdahl's law, parallelisation, speedup, multi-core architecture

Learning Outcomes

- Understand how parallelising parts of a program can help speed up the execution.
- Understand that allowing multiple cores to spread out the processing of a program decreases execution time
- Understand the importance of parallelism

Success Criteria

- I can understand how parallelisation is an important factor in speeding up a program
- I can explain the need for multiple cores when computing.

Time Required

1 period - 1 hour

Preparation

Board can be drawn on the whiteboard if it is too much effort to draw up/create.
Create the board:

Includes a background
Four "cores"
An example of a program - doesn't need to be a huge program
Time along the bottom of the graph

Prior Learning Assumed

None, this will be a new topic.

Outline of Activity

1. Explain to the class that we are going to be looking at a new topic for computing, called parallelism.
2. Show the board and explain that this is what a model computer might look like inside, with its multiple cores - which are essentially like little computer brains.
3. Outline that say for example you want to want to dig a very big hole. One man might take 60 minutes to dig this big hole, and that this is like giving one core all the work to do. It's going to be really really slow and difficult to do.

4. Ask the class for any feedback on what they might do instead? Some options might be:
    a. Get more men involved to share out the task
    b. Dig a smaller hole - we need this hole to be this size!
5. Suggest that the concept of getting more men involved to share out the task is correct - this idea is called parallelism!
6. Split the program up on the board into its multiple processors, and show that over time along the bottom the time taken gets shorter and shorter.
7. Explain why parallelism is important - suggest maybe it is unfair to let one man do all the work as it is slower and more difficult to manage.