



F9.6 Memory

Logic and computer systems · GCSE · OCR J277 1.2.1, AQA 8525 3.4.5,
Edexcel 1CP2 3.1.1 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

RAM, ROM, cache and virtual memory.

- RAM
- ROM
- Cache
- Virtual memory

Questions

5 marks in all

1. What does volatile mean? [1 mark]
☐ A The contents are lost when the power is off
☐ B It can only be read
☐ C It is very fast
☐ D It is stored on a disk
2. What is ROM used for? [1 mark]
☐ A Holding the boot program that starts the computer
☐ B Holding the programs currently running
☐ C Storing a user's files
☐ D Speeding up the CPU with copies of data
3. What is virtual memory? [1 mark]
☐ A Part of secondary storage used as extra RAM when RAM is full
☐ B Memory inside the CPU
☐ C RAM that keeps its contents without power
☐ D Memory on another computer
4. Why does a computer slow down when it uses virtual memory a lot? [1 mark]
☐ A Secondary storage is much slower than RAM
☐ B Virtual memory uses more power
☐ C The CPU stops while it is used
☐ D Virtual memory is smaller than RAM

5. Put these in order from fastest to slowest.

[1 mark]

Number the lines 1 to 4 to put them in the right order.

- ___ Registers
- ___ Cache
- ___ Secondary storage
- ___ RAM

The task: out of RAM

A computer has 4 GB of RAM, and the operating system always uses 1 GB. The apps in `apps` are opened in order. For each one, while it does not fit, move the app that has been in RAM longest to virtual memory and print `moved <name> to virtual memory`. Then load it and print `<name> -> RAM`. At the end, print `RAM used: <n> GB` and in virtual memory: `<names>`, the names joined with `,`.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

ram_size = 4
os_size = 1
apps = [("browser", 1.5), ("game", 2.0), ("music", 0.5), ("editor", 1.0)]
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f9-6-memory/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Change `ram_size` to 8. How many moves to virtual memory are there now?
2. Reopen the browser at the end. What has to move out for it to come back?
3. Why does a robot's boot program live in ROM rather than RAM?