

8 Introduction to Computer Architecture (swm11)

- (a) What is the *power wall* and why does it lead to the idea of *dark silicon*?
[3 marks]
- (b) What is the difference between race-to-dark (also known as race-to-sleep or race-to-halt) and dynamic voltage/frequency scaling in order to save power?
[3 marks]
- (c) Why does dark silicon lead system-on-chip designers to incorporate accelerators? Give an example of an accelerator to illustrate your answer.
[4 marks]
- (d) Why might systems-on-chip contain many more processor cores than the application class cores, which are typically the ones advertised? What characteristics do these cores possess?
[4 marks]
- (e) Why do you need to perform both a row access and column read when reading data out of DRAM? What does each operation do?
[3 marks]
- (f) DRAM can perform burst reads and writes of several words. How does the last-level cache use and benefit from DRAM burst accesses?
[3 marks]