

EEE225 Problem Sheet 3 - NJP

1. Why does a CPU have a clock? If computer X has a faster clock speed than computer Y, does this mean that computer X has a higher performance than computer Y? If not, why not.
2. Computer X runs four times faster than computer Y. If computer Y takes 36 seconds to run a given application, how long does it take computer X to run the same application.
3. A certain application written in C++ runs in 20 seconds on your laptop. You obtain a new C++ compiler that requires only 60% as many instructions as the old compiler. Unfortunately it increases the CPI by 1.2. How much time is saved by using the new compiler?
4. Different classes of instructions can have different CPIs. For a particular computer, the CPI for each of three classes of instructions is shown in the table.

	CPI for each instruction class		
	A	B	C
CPI	1	2	3

A particular high level language statement can be achieved by one of two different code sequences. The instruction count for each sequence is shown in the table below.

Code Sequence	Instruction counts for each instruction class		
	A	B	C
1	2	1	2
2	4	1	1

Which code sequence executes the most instructions?
Which will be faster? What is the CPI for each sequence?

5. A certain application runs in 10 seconds on computer X, which has a 2 GHz clock. We wish to design a new computer Y, which is able to run the same application in 6 seconds. The latest technology means that a significant increase in clock speed may be made but restrictions on the new architecture mean that computer Y will require 1.2 times as many clock cycles as computer X for the same program. What clock rate should we target for the new computer?
6. What is meant by a CPU limited task?
7. How many address bits are required for a 32MB byte wide ROM device?
8. Write down the truth table for a 2-4 line address decoder with active low outputs.