

Introduction to the Use of Computers
Computer Processors
Friday 2nd November 2012

This lab session is about the operation of computer processors and their relationship with other components in a CPU system.

1. This part involves simulating a CPU.
 - (a) working in groups of five, collect one set of instruction cards from the tutor; you will also need some space for writing temporary values down (a sheet of paper will be fine), and a few cards on which to write output values. Depending on the set of instruction cards you have, you may also need an input data pile.
 - (b) to start, take the instruction pile and place it face down. Each member of the group in turn must take the top card of the instruction pile, read the instructions on the card, and follow the instructions. This may involve doing a calculation, writing the result of that calculation somewhere, or even manipulating the instruction pile itself. Follow the instructions carefully and precisely.
 - (c) Discuss among the group what you think the relationship is between the input data values you are given and the output values your CPU simulation is producing.
2. This part of the lab consists of questions to reinforce and extend the material taught in lectures.
 - (a) Draw the logical circuit for a bistable latch, and explain how it can be used to store one bit of information.
 - (b) Describe how communication of data occurs between main memory and the processor. Find a definition of memory *cache*, and explain how it improves system performance.
 - (c) Suggest why reading data from optical media might be slower than reading data from hard disk drives.