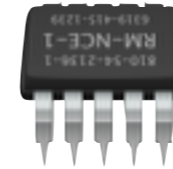


LORETO PRIMARY SCHOOL, DALKEY

FUNDAMENTALS OF PROGRAMMING 2016

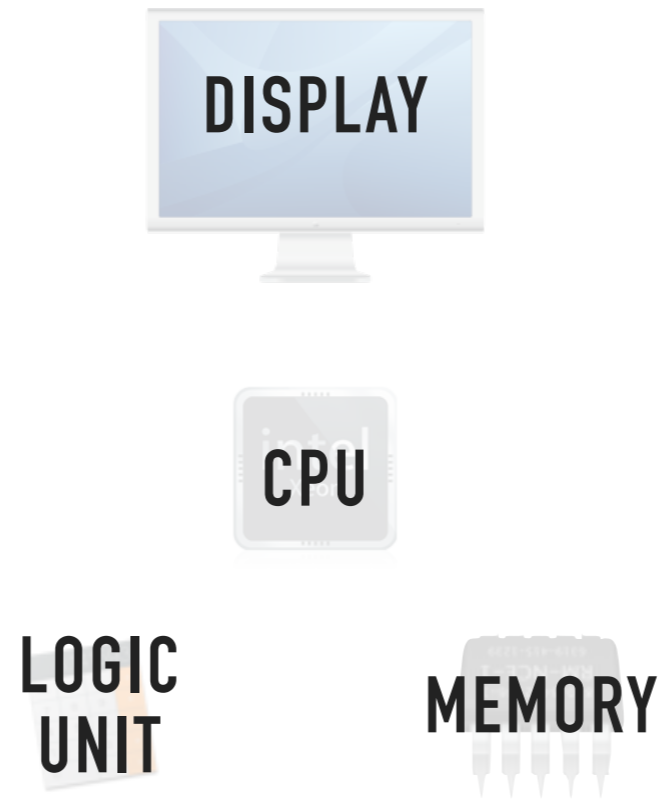
Matthew Hanlon - Wicked Pear Programming - 2016

WE'RE GOING TO BECOME A SUPERCOMPUTER



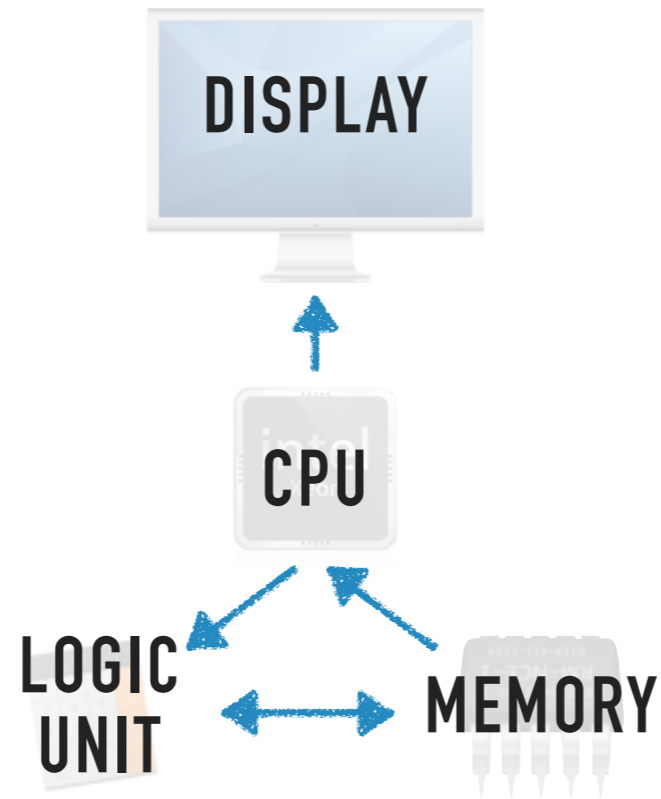
Using some of the material at http://cse4k12.org/how_computers_work/, we presented an introduction to computer programming to the girls at Loreto Primary School in Dalkey, Co. Dublin, Ireland. The intent was to prepare them for their week of code and break computer coding down to its bare essence to demystify the process a little bit.

WE'RE GOING TO BECOME A SUPERCOMPUTER



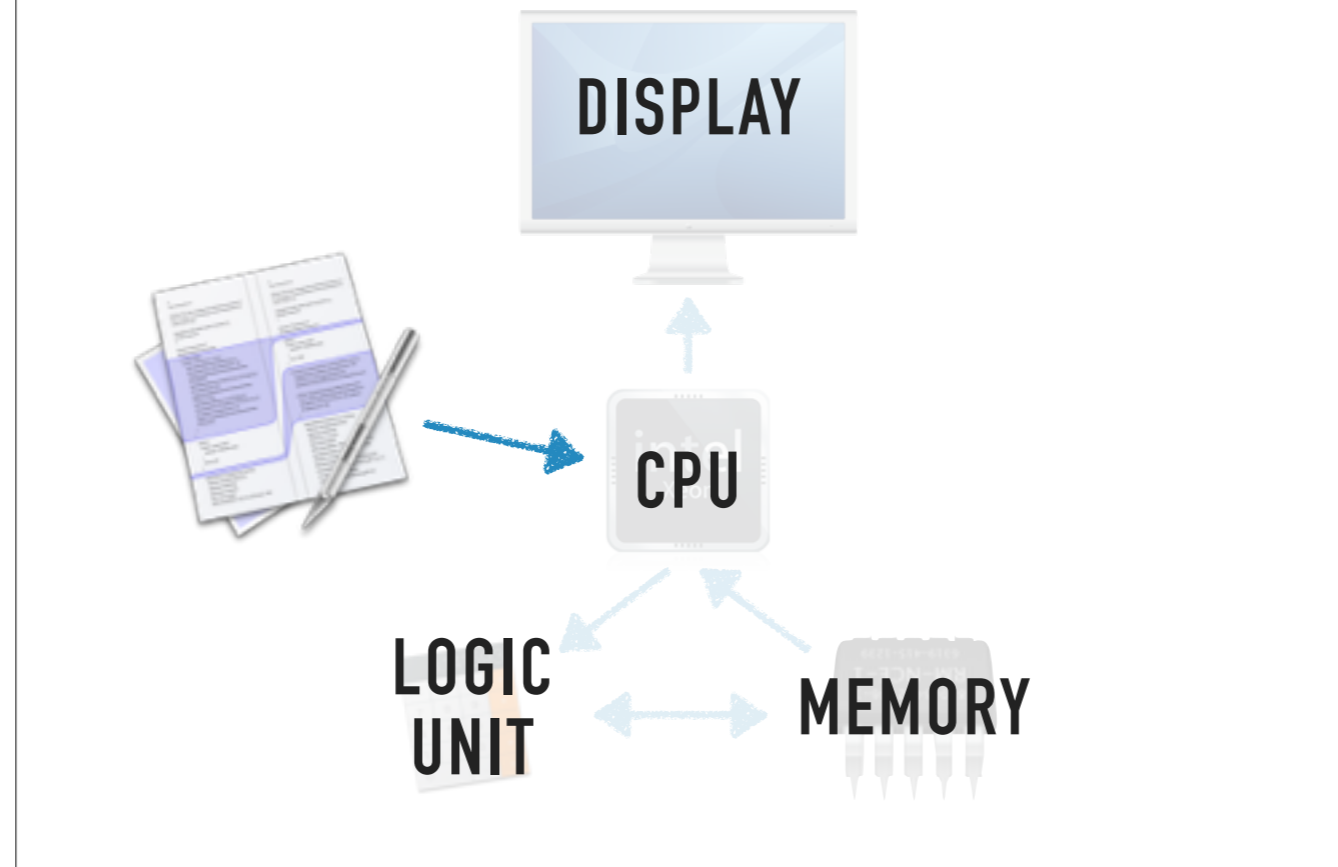
We had sixth class be the display (for sheer reach at the white board at the front of the hall and their coordinate plane knowledge), fifth class be the CPU, fourth class be the logic unit, and third class be the memory.

SUPERCOMPUTER: CONNECTIONS



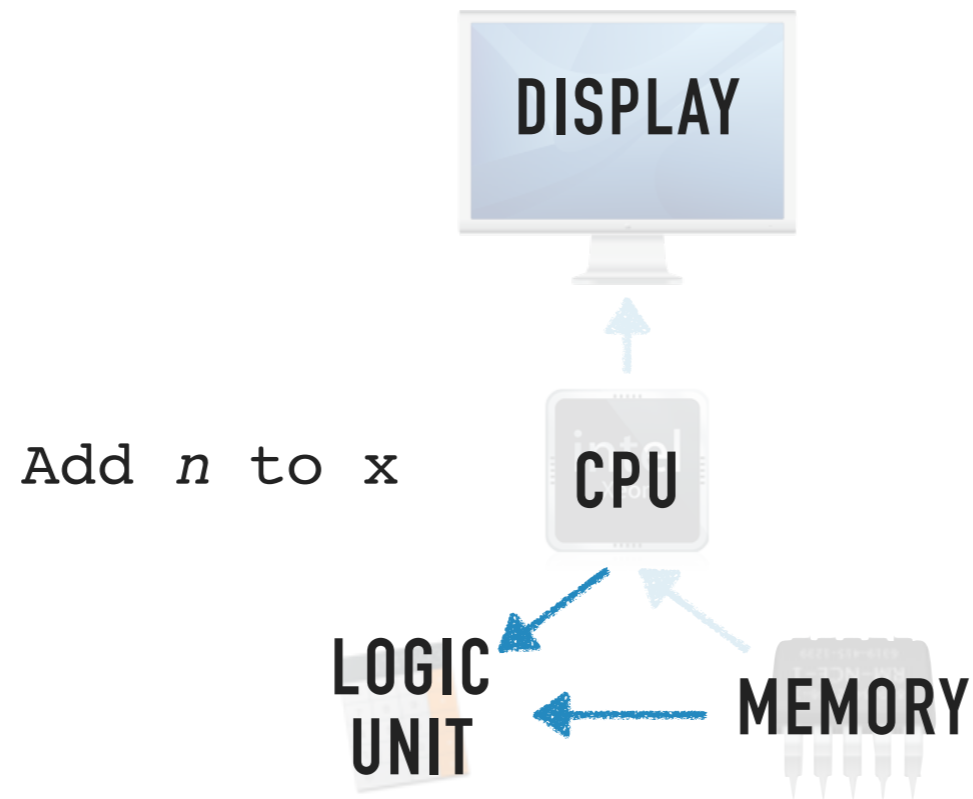
Instead of circuits our connections were all done wirelessly, with shouting across the hall. To minimize injuries, each group would shout their command or request or response to the appropriate component in question with a little guidance from some mentors.

SUPERCOMPUTER: INSTRUCTIONS



We'll start our program by feeding the CPU a set of instructions to execute

SUPERCOMPUTER: ADD COMMAND

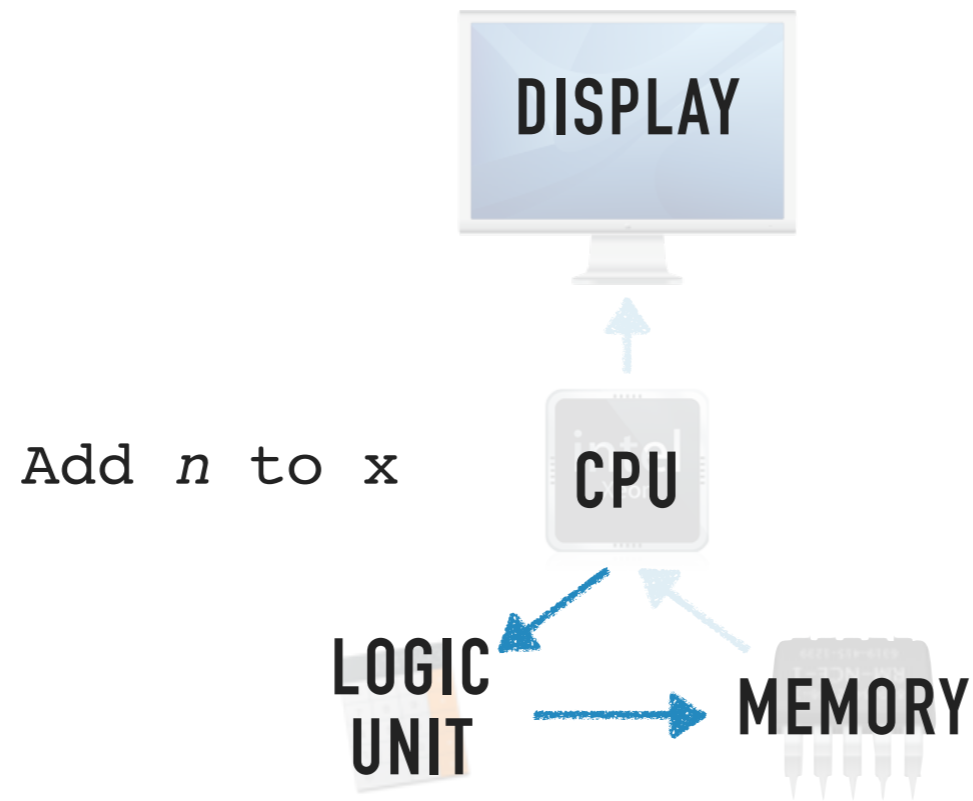


The CPU sends the `add` instruction to the logic unit. In our assembly, memory will translate the value of 'x' (or 'y') into whatever value is stored and shout out the addition instruction to the logic group, who will answer back with the result. E.g:

MEMORY: Add 3 to 1

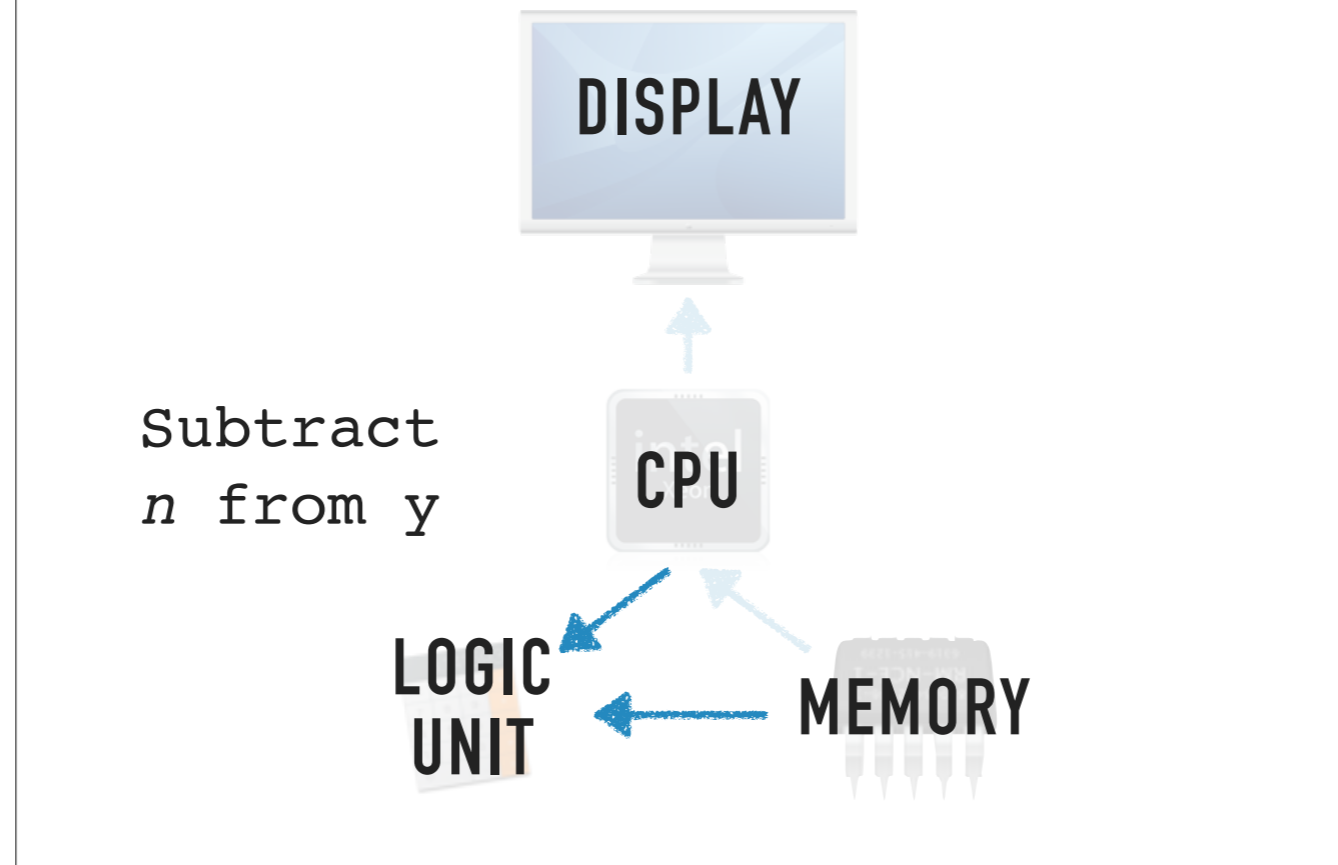
LOGIC: 4

SUPERCOMPUTER: ADD COMMAND



The memory group will record the logic group's answer into that register ('x', in this case).

SUPERCOMPUTER: SUBTRACT COMMAND

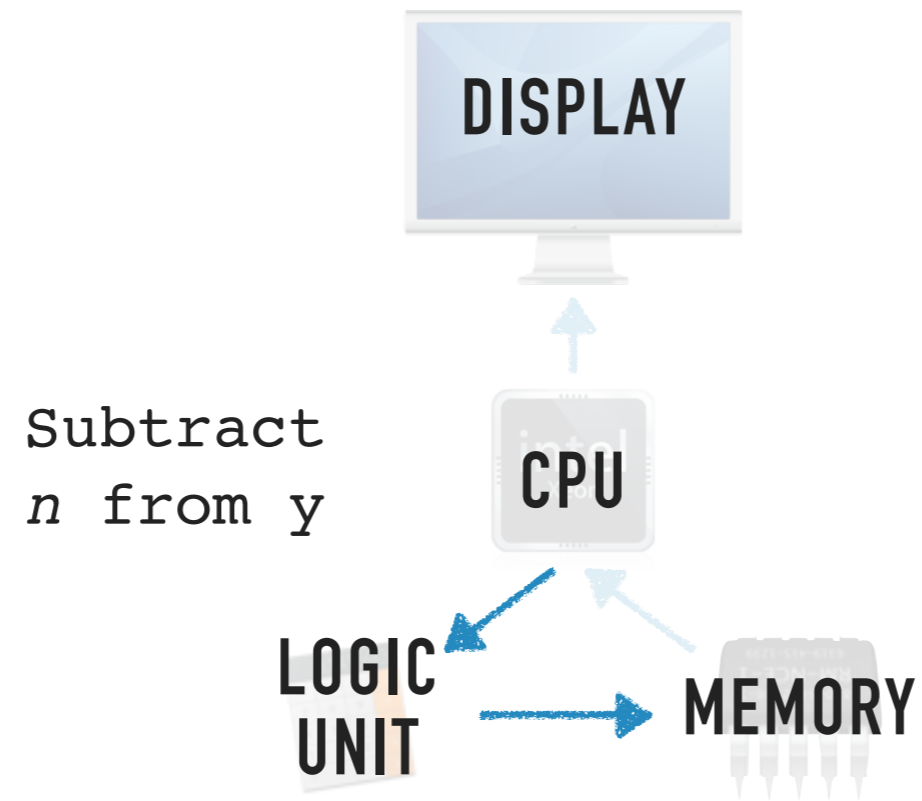


Just like the **add** instruction, the **subtract** instruction results in the memory group shouting out the subtraction instruction to the logic group, who will answer back with the result. E.g:

MEMORY: Subtract 2 from 7

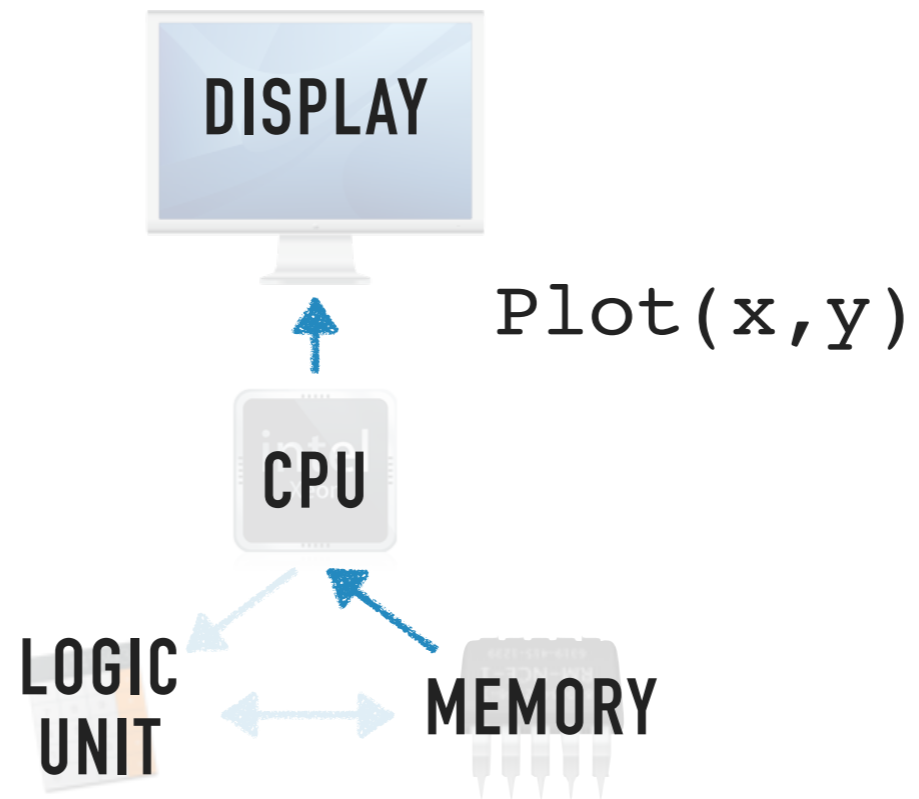
LOGIC: 5

SUPERCOMPUTER: SUBTRACT COMMAND



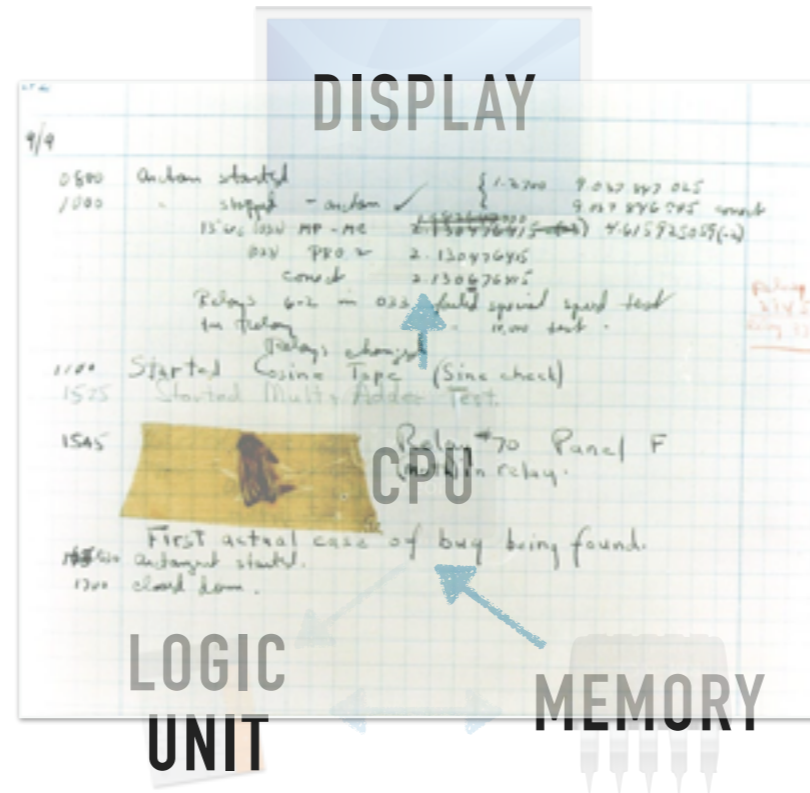
Again, the memory group will record the logic group's answer into that register (' y ', in this case).

SUPERCOMPUTER: PLOT COMMAND



For the `plot` instruction the CPU will ask the memory group for the values of 'x' and 'y' and pass them on to the display group to draw into the appropriate square for the grid.

SUPERCOMPUTER: DEBUGGING



Sometimes we'll have bugs — the CPU will send the same instruction twice, or skip one, or memory will write down the wrong number, or logic will get the math wrong, or the display will mis-plot the coordinates. It happens. When this happens, go with it. You might get a crasher, you might get a more beautiful picture. It's a good learning point.

CREDITS

THIS PRESENTATION HAS BEEN ADAPTED FROM THE EXCELLENT EXERCISE BY GARY KACMARCIC AT [HTTP://CSE4K12.ORG/HOW_COMPUTERS_WORK/](http://CSE4K12.ORG/HOW_COMPUTERS_WORK/)

ACTIVITY AND DOCUMENTS CREATED BY GARY KACMARCIC. ©2007, 2010

THESE DOCUMENTS ARE LICENSED UNDER A [CREATIVE COMMONS ATTRIBUTION-SHARE ALIKE 3.0 UNPORTED LICENSE](https://creativecommons.org/licenses/by-sa/3.0/)

THANK YOU