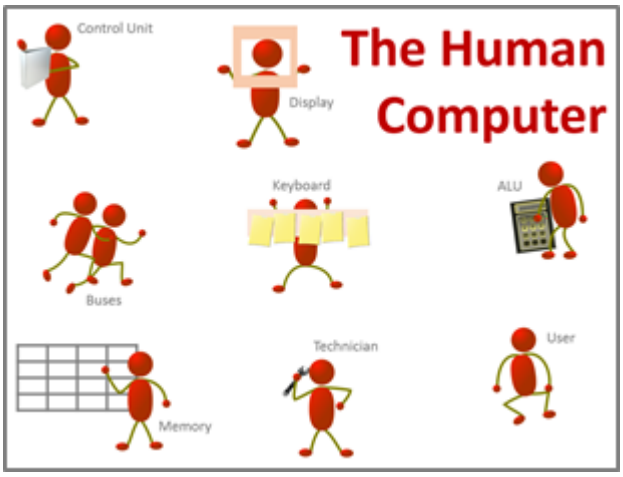
Hiccup: The Human Computer Simulation

This group activity needs careful preparation. It is best to assemble all the equipment first. Groups of 6 or 7 work well. Children act as computer components. The simulation works well outdoors. Each group requires enough space to keep components separate, but not too distant, perhaps constrained in a chalked diagram of a computer system.



Equipment List (for each group)

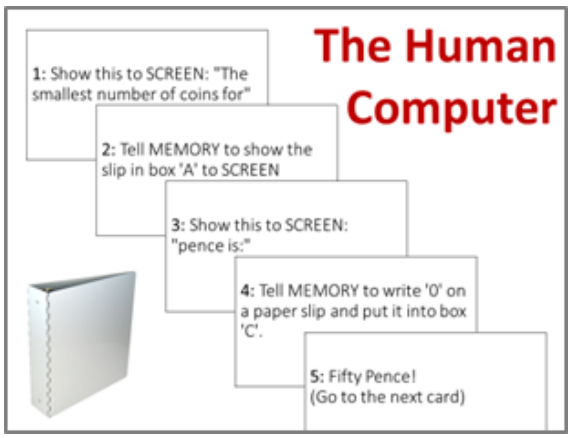
- ☐ Large box or whiteboard for screen / printer
- ☐ Keys for simulated keyboard
- ☐ Large stock of plain paper slips
- ☐ Boxes / trays / pigeonholes to act as Memory slots
- ☐ Memory location labels (A-J) for the above slots
- ☐ Component labels printed or folded into hats.
- ☐ Masking tape or blu-tac for labels / hats
- ☐ Board Markers for children acting as memory, keyboard, printer / screen components
- ☐ Hiccup Change Program cards, guillotined, hole punched, and held in ring binder.
- ☐ Hiccup Hi-Low Program cards, guillotined, hole punched, and held in ring binder.
- ☐ Code listings for technician.

Two programs are supplied; to program to calculate coins in change and a High-Low guessing game.

Hiccup Change Program needs pupils for the following components: Memory, ALU, Control Unit (Instruction Decoder) and Printer. A minimum of 4 pupils. Use a further 1 or 2 as data buses. Double up for Instruction Decoder if further flexibility is needed. This is the key role. Note also that this program needs a number placed in memory slot A before it starts. To keep running time down – use 67 which produces a result of a 50p, 10p, 5p and 2p piece.

The Hiccup Hi-Low Program needs the following: A User, Keyboard, Memory, ALU, Control Unit (Instruction Decoder) and Screen. A minimum of 6 pupils. Again use up to 2 as data buses. Double up for Instruction Decoder if required. Instructions are included in the resources to give to each 'component'. Ensure they read them. For both programs you can also use one person as ROM – to label each part by sticking a name on them or issuing their component hat. They have no role after that, and stand by the teacher—potentially useful if you wish to involve a child but exert close control! The teacher or an able child can be a technician. They have a code listing and observe the action, intervening if things go wrong.

Unlike a normal computer, all instructions are help (in order) by the Control Unit. These are processed in turn. The first five 'Change Program' instructions are shown. First the Control Unit writes the message on a slip of paper, gives it to the buses, who show it to the screen. The screen writes it on a display. Second the Control Unit tells Memory to write the value in Box A (67) on a slip of paper, give it to the buses, who show it to the screen, who adds it to the display. Notice that it takes 3 instructions just to get a message on the screen!



Note also instruction 5: Here nothing is done! This is a label or placeholder. It will be used later when a jump is required to return to this place in the program. They are used to control program flow, implementing selection statements and loops, so a ring binder works well to hold the programs. This allows the Control Unit pupil to return to a previous point without losing the order of the instructions.