What is a computer? [**Ask for answers.**]

The OED defines a computer as; "An electronic device which is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a predetermined but variable set of procedural instructions (a program) to produce a result in the form of information or signals".

Actually, the first computers weren't electronic at all, they were mechanical:
- Music boxes
- Player pianos
- The Jacquard loom.

So, what is a computer program? [**Ask for answers.**]

The OED defines a computer program as; "A series of coded software instructions to control the operation of a computer or other machine".

Music boxes use brass cylinders with spikes on them to pluck tuned teeth on a metal comb. Player pianos use perforated paper 'piano rolls' to play tunes. Digital music workstations use the same concept for composing and displaying music although it is stored and played using MIDI.

The Jacquard loom used punched cards to control the patterns woven into the fabric and a variant of these punched cards were later used by Herman Hollerith to store and process American census data. He also started the company that went on to become IBM, one of the biggest computing companies in the world. From simple ideas fortunes can be made …

Do any of you, or your parents knit? Because a knitting pattern is a form of computer program. Those patterns may have made sense to my mother but they are far too complicated for me and I can program in more than 13 different computer languages and understand a lot more.

Now, the fun starts – [**produce paper, pencils and hair clippers**] – you are going to write an algorithm to perform a physical task. You are going to program a robot to cut someone's hair – and someone in this room is going to leave here with a lot less hair than they started with …

I want you to split into two teams and think about the steps needed to cut your hair:
- walk in
- sit down
- wrap towel round neck
- etc.

Here are the tools you need (show them the): newspaper, chair, towel, and clippers.
What you will be doing here is writing an algorithm – a set of instructions that can be turned into a computer program – which could control a robot. Or, in this case, me.

Think about it in detail because we don't want one of you going home minus an ear, do we? And remember, the computer / robot will do *exactly* what you tell it to and *only* what you tell it to.

Ask the team leaders to read out the instructions.

Ask for a victim from each group to test their program. Did I say victim? I meant volunteer …

Finally, and not for the faint of heart, the group leader enacts the following *Hair Cutting Algorithm* step by step and shaves his [or her] head.
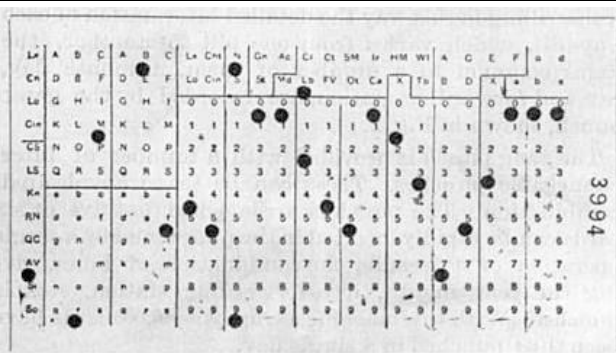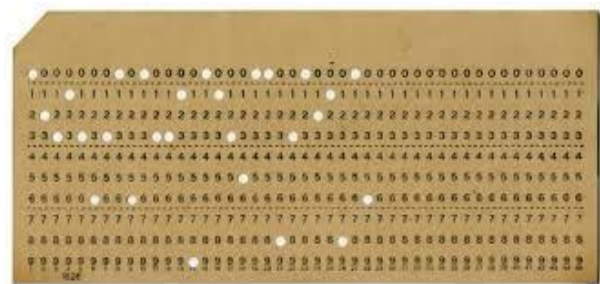
Piano Roll

Music Box

Jacqard Loom

Hollerith Punched Card

IIBM Punched Card

Hair Cutting Algorithm.

1. Spread Newspaper on ground
2. Place chair on newspaper
3. Sit person on chair
4. Position towel round persons neck
5. Pick up clippers
6. Turn on clippers
7. Lean persons head forward
8. Choose starting point [on persons head / neck]
9. Place clippers in contact with persons skin
10. Move clippers forward whilst keeping clippers in contact with persons scalp
11. Stop moving when you get to persons: forehead, ear or other body part
12. Remove clippers from persons scalp
13. If Not Done?
14.   Reposition clippers to an uncut area of persons scalp
15.   Goto Step 9
16. Turn off clippers
17. Remove towel
18. Clear up hair clippings
19. Done!