



Year 8
ICT
Computer Science & History



Name _____

Tutor Group _____

Teacher _____

Given out: Monday 24 February Hand in: Monday 2 March

Parent/Carer Comment

Staff Comment

Target

Home Learning Task

For this Home Learning Task, you will be learning and finding out about:

- How computers are made.
- What the different components do.
- The history of computers.
- How computers work.

Sources of Information

Teach-ICT.com
MSMilki.com

.....plus any other resources you can find from the internet.

This Home Learning task is a paper only exercise, all work is to be completed in this booklet.

What do I already know?

What do you already know about the following?

	I know a lot about this topic.		I have come across this but I am not really sure what it means.		I have never heard about this before.
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At the start of the home learning			
			
Colossus			
Transistors			
Code Breaking			

The Colossus and Code Breaking Task

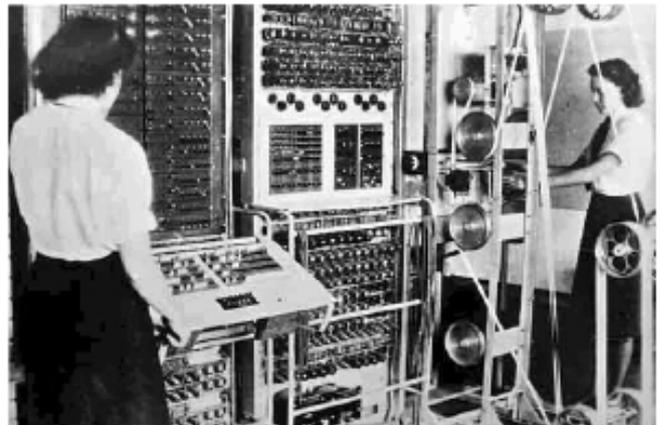
Colossus

Birth of the digital computer

Colossus was an electronic digital computer, built during WWII from over 1700 valves (tubes). It was used to break the codes of the German Lorenz SZ-40 cipher machine that was used by the German High Command. Colossus is sometimes referred to as the world's first fixed program, digital, electronic, computer. It was developed and built before the American ENIAC computer. ¹

Colossus was designed by Tommy Flowers, an electronics engineer of the *Post Office Research Station* (part of the *General Post Office, GPO*) at Dollis Hill (UK), with input from Harry Fensom, Allen Coombs, Sid Broadhurst and Bill Chandler. It was used to solve a problem posed by Max Newman, a codebreaker at Bletchley Park.

The image on the right shows one of just eight photographs of an original Colossus Mark II in action that were taken during WWII. The images were used in 1993 by Tony Sale and his team of volunteers, to start the *Colossus Rebuild Project*.



One of the most prominent parts of Colossus is the input device on the right, nicknamed 'the bedstead'. It is an optical reader for punched paper tapes, than can read data at the phenomenal speed of 5000 characters per second! A complex system of supporting wheels is necessary to regulate the tape tension and prevent the tape from ripping apart at this speed.

Contrary to popular believe, Colossus was not used to break the German Enigma machine. The Enigma was broken by means of an electro-mechanical machine, known as the Bombe, designed by Alan Turing and Gordon Welchman.

Colossus on the other hand, was used to break the Lorenz SZ-40/42. A highly sophisticated teleprinter attachment with no less than twelve complex cipher wheels. It was used by the German High Command for messages at the highest level, for example between Hitler and Field Marshal Rommel in North Africa.



The first Colossus was delivered at Bletchley Park on 18 January 1944 and broke its first message on 5 February of that year. It was succeeded by Colossus Mark II, which consisted of no less than 2400 valves. The first Colossus Mark II was delivered on 1 June 1944 — just five days before the D-Day landings on the Normandy coast — and immediately produced good intelligence. In total 10 Colossi were installed before the end of the war. After the war all Colossi were dismantled.

Find out about Colossus and answer the questions below. The text will help you with some of the answers but you will need to do some research for the others!

1. In which year was the very first electronic digital computer created?

2. What was the name given to this computer?

3. What was the name of the place where this computer was created?

4. What was the main role of this computer?

5. Colossus used 'valves'. What was the role of these valves?

6. How many valves were used on each of the 10 Colossus machines?

7. What were the two main problems caused by using the valves?

I

II

8. Many years later transistors were invented. How did transistors help in the development of new computers?

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9. Roughly how many transistors might you find on a modern laptop?

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Transistors and Moore's Law Task

Find out about Moore's Law and answer the questions below.

1. In which year was the transistor first invented?

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2. Write down the names of three electronic devices that you own which contain transistors.

I
II
III

3. List at least three advantages that transistors have over valves.

I
II
III

4. The first CPUs contained around 2,000 transistors. How many might you find on a CPU today?

5. Which is smaller, the tip of a human hair or a transistor?

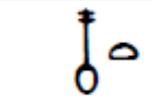
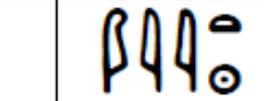
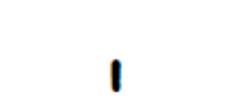
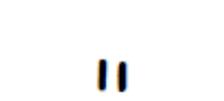
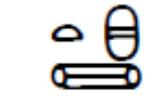
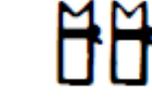
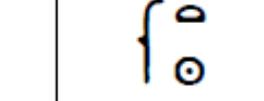
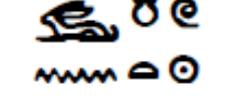
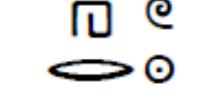
6. Transistors can act as a digital switch inside the CPU. They can be either or

7. Gordon Moore made an observation that was so accurate it became known as Moore's Law. What does Moore's Law say?

Hieroglyph Code Breaking

Colossus was used to decrypt Nazi wartime codes, using this A-Z, can you solve the Egyptian Hieroglyph Code on the next page?

Hieroglyph Code

 A	 B	 C	 D
 E	 F	 G	 H
 I	 J	 K	 L
 M	 N	 O	 P
 Q	 R	 S	 T
 U	 V	 W	 X
 Y	 Z		

Transistors and Moore's Law

Below is a set of notes about **Transistors and Moore's Law**.

Unfortunately, are 20 mistakes. Read through the text and correct the mistakes - can you find them all?

Transistors were first invented in 1847 in the USA. The transistor changed computing and paper based devices forever. Indeed every device you own might contain a transistor.

Transistors are extremely large when compared to the older valves used in Apple Macs. They are fast and use a lot of power. Another good thing is that they have no moving parts and so lots of them can be crammed together onto a single hard disk. A modern day computer chip can contain around 200 transistors. They are far too small for the eye to see, in fact, around 3 million would fit onto the end of a Rolo.

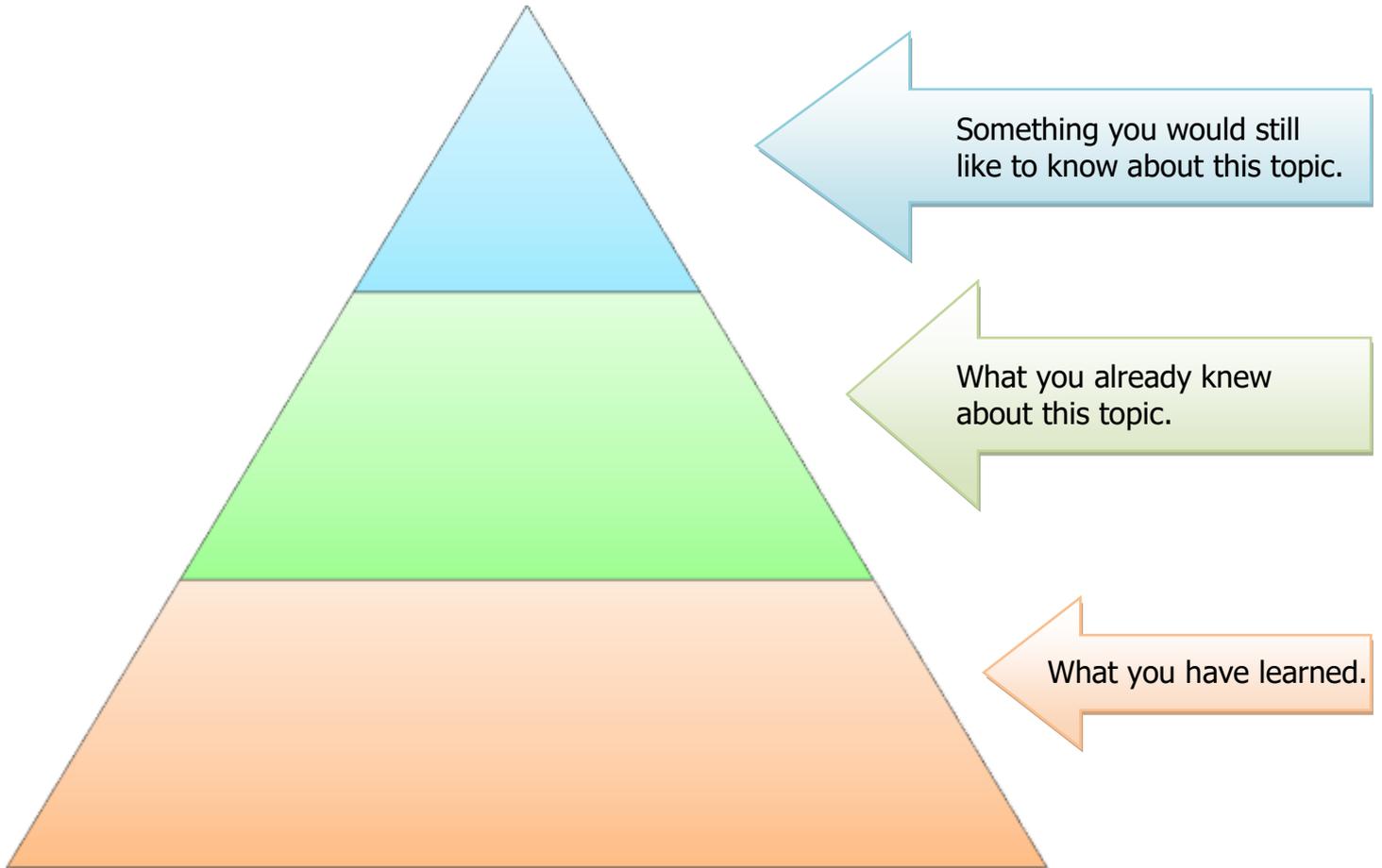
There are different types of transistors which do specific jobs. The ones inside the CPU mostly act as digital switches allowing colourful data to be represented forever. Each digital switch can be either in the IN or OUT position at any instant.

Transistors can be combined inside the CPU to do other jobs such as processing data and playing music.

Gordon Less was a brilliant engineer who helped to create Intel back in the 1960s. In 1965 he noticed that the number of transistors in a computer chip was decreasing roughly every two years and he predicted that this trend would continue. This became known as Gordon's Law and so far it has proved to be incredibly unreliable. Unfortunately, transistors are now becoming so large that there is a physical limit to how much more they can be shrunk before they stop working properly. Robots are working hard to find alternative ways of being able to increase computing power before the limit has been reached.

Pyramid: Computer Science

Write on or around the pyramid



	I know a lot about this topic		I have come across this but I am not really sure what it means		I have never heard about this before
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At the end of the home learning			
			
Hard disk			
CPU			
Motherboard			
RAM			
Power supply			
Graphics card			