Module 4

Digital Electronics: What's behind It?

Unit 10 Computers: How Do They Work?

Glossary
huge: great
strand: a thin thread of something

DNA Computing

DNA computing does not use traditional silicon-based computer technologies. It is an innovative form of computing that uses DNA, biochemistry and molecular biology. DNA computing is also called bimolecular computing.

Even though DNA computers can't be found at your local electronics store yet, they will have a **huge** number of advantages over today's computers.

The main benefit of using DNA computers is that they can solve many complex problems at the same time. This is known as parallel processing. As it is possible to fit more than 10 trillion DNA molecules into an area less than 1 cm3, a DNA computer could hold 10 terabytes of data and parallel process 10 trillion calculations all at the same time.

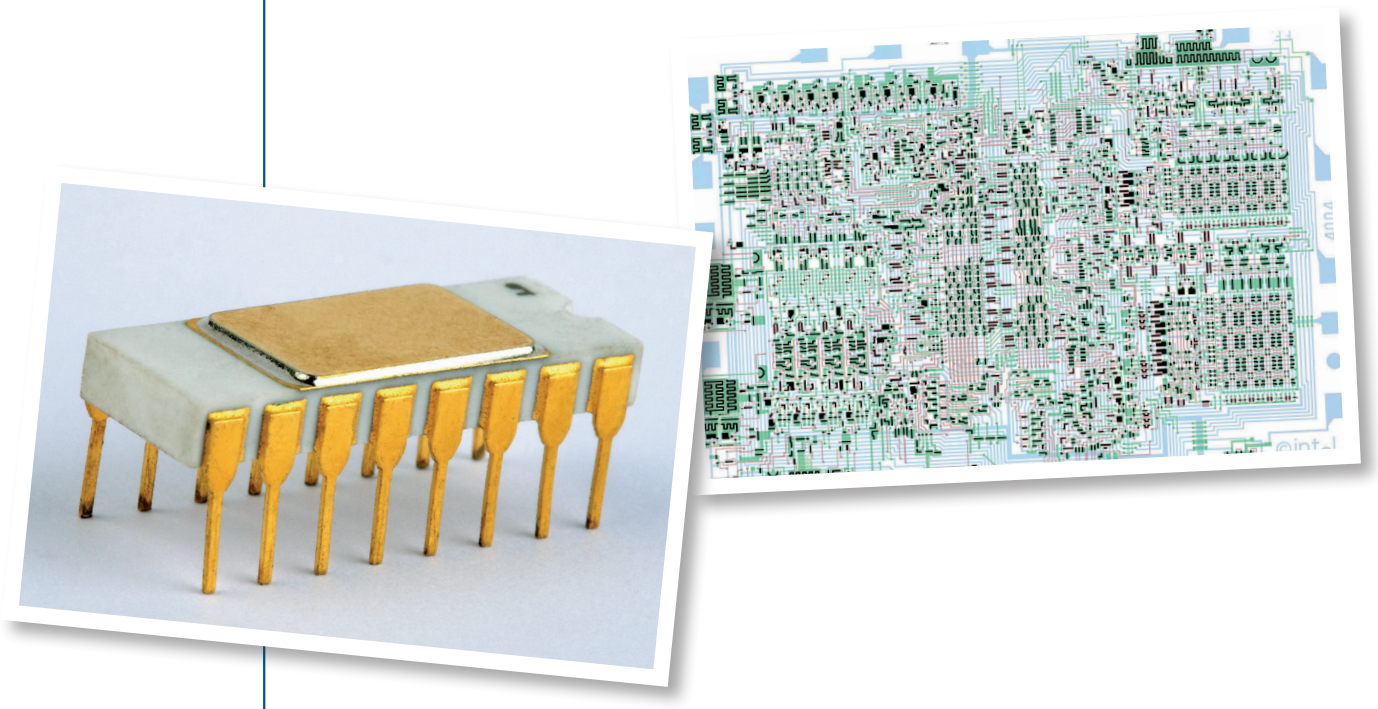
Advantages of DNA computing include the following:

- it is extremely fast compared to conventional computers in complex modelling;
- it is very light in weight compared to conventional computers;
- it requires much less power than a conventional computer.

Disadvantages of DNA computing include the following:

- errors are more common due to the complexity of DNA **strands**;
- it is much more expensive than conventional computing;
- it is very difficult to build compared to conventional computers;
- problems that need a sort algorithm are slower than on a conventional computers;
- simple problems actually take longer to process.

(Adapted from Steve Cushing, *Edexcel GCSE Computer Science Student Book*, Hodder Education, 2015)



Understanding the text

1. Find five adjectives in the text related to DNA computing.

1. .....
2. .....
3. .....
4. .....
5. .....

2. Tick the sentences that best express the concepts contained in the text.

1. ☐ DNA computing performs computations using biological molecules, instead of traditional silicon chips.
2. ☐ Unlike conventional computers, DNA computers perform calculations parallel to other calculations.
3. ☐ The idea that individual molecules could be used for computation dates back to 1959.
4. ☐ DNA computers will be capable of storing billions of times more data than today's computers
5. ☐ DNA's key advantage is that it will make computers smaller and faster than present day computers.
6. ☐ Studying DNA computers may also lead to a better understanding of the human brain.

3. Write a paragraph about the main innovations that have taken place in the last decade in computing. Focus on the following elements.

- Type of innovations
- Advantages/disadvantages
- Your opinion about them

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