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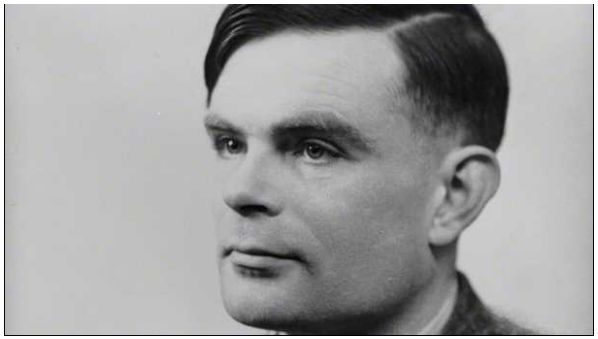
People

Alan Turing



Who was Alan Turing?

Alan Turing was an English mathematician and pioneer of theoretical computer science and artificial intelligence. During WW2, he was instrumental in breaking the German Enigma code, leading to Allied victory over Nazi Germany.

What happened in Alan Turing's early years?

Alan Turing was born on 23 June 1912 in Maida Vale, London.

His intelligence was clear from his school days. At the age of 9, his headmistress from St Michael's Primary School in Hastings reported: 'I have had clever boys and hard-working boys, but Alan is a genius'. Turing moved to Hazelhurst Preparatory School in 1922 where he became interested in chess, spending hours working out complex chess problems on his own.

At the age of 13, he attended Sherborne School in Dorset. Although his maths teacher Mr Randolph declared him a 'genius', this counted little in a school that placed its emphasis on humanities and classics. Teachers would often get annoyed with him for his high marks in exams despite him paying little attention during lessons.

What was Alan Turing's relationship with Christopher Morcom?

Towards the end of his time at Sherborne, Turing formed a close relationship with another student, Christopher Morcom, who shared his intellectual curiosity and inspired Alan's future endeavours. He has been described as Turing's 'first love'. However, their relationship was cut short by Morcom's death in 1930 from tuberculosis. Turing coped with his grief by devoting his energy to scientific study in an attempt to fulfil his friend's potential.

What happened in Alan Turing's university years?

Turing attended King's College, University of Cambridge, in 1931 to study mathematics. In this academic environment, he settled in much better and his years there were highly successful in both his work and social life. Turing took up rowing and became an excellent long distance runner. He also became involved in the peace movement, joining the Anti-War Council, which called for chemicals and munitions workers to strike if war was declared amid the rise of Hitler.

Turing graduated in 1934 with a first-class honours degree and as a result of his dissertation, was elected a Fellow of King's College at the age of 22.

In 1936 Turing went on to study mathematics at Princeton University, New Jersey, obtaining his Ph.D. in 1938. During his time here, he developed the notion of a 'universal computing machine' which could solve complex calculations. This would become known as the Turing machine, which foreshadowed the digital computer.

He also studied cryptology, the study of codes and cyphers which can be used to send secret messages, and built three out of

four stages of an electro-mechanical binary multiplier.

What did Alan Turing do at Bletchley Park?

In 1939, Turing was asked to join the Government Codes and Cypher School, a British code-breaking organisation (now GCHQ), which was moved to Bletchley Park when war was declared on 3 September.

Turing's most notable achievement at Bletchley was cracking the **'Enigma' code**. The Enigma was an enciphering machine used by the German armed forces to send messages securely. Together with fellow code-breaker Gordon Welchman, Turing developed the *Bombe*, a machine based on an earlier Polish design, which from late 1940 was decoding all messages sent by the Enigma machines.

Next, Turing turned his attentions to the more complex German naval signals, and together with his '**Hut 8**' team at Bletchley, succeeded in decrypting these as well in 1941, contributing to Allied victory in the Battle of the Atlantic.

In July 1942, Turing developed a complex code-breaking technique he named '**Turingery**' for use against the Lorenz cipher messages produced by the Germans' new *Geheimschreiber* (secret writer) machine.

Turing also developed a secure speech system, which he named **Delilah**. The system, which encoded and decoded voice communications, was intended to be used in a similar way to a telephone scrambler. He demonstrated its mechanisms on one of Churchill's speeches, but the machine was never commissioned for use in the war effort.

What did Turing do after his work at Bletchley Park?

In 1945 Turing was awarded an OBE for his services to the country and in 1949, was made deputy director of the Computing Laboratory at the University of Manchester.

Turing first addressed the issue of Artificial intelligence (AI) in his famous paper *Computing Machinery and Intelligence* (1950). In it, he devised what he called the 'Imitation Game' (now called the 'Turing Test') – a method to determine whether a machine showing behaviour can truly be called 'intelligent'. The test has significantly influenced research on AI.

Why was Alan Turing convicted?

In 1952, Turing reported a burglary to the police, where it emerged that the perpetrator Arnold Murray was in a sexual relationship with him. As a result of anti-homosexuality laws in the UK in the 1950s, Alan was charged with gross indecency (overturned in 2013). He avoided prison by accepting chemical castration, which eventually left him impotent.

Turing's security clearance was also removed and he was barred from continuing his work with cryptography at the GCHQ.

How did Alan Turing die?

On 7 June 1954, Turing was found dead from cyanide poisoning. An inquest ruled that it was suicide, although this has been contested more recently, with Turing expert Prof Jack Copeland attributing his death to the accidental inhalation of cyanide fumes during an experiment.

What was Alan Turing's legacy?

The extent of Alan Turing's work did not fully come to life until after his death. His impact on computer science is commemorated in the annual 'Turing Award' – the highest accolade in the industry. Meanwhile, his code-breaking operations at Bletchley Park are credited with shortening the war by as much as two years and resulting in Allied victory – saving countless lives in the process.

In 2015 a new national centre for research in data science and AI, The Alan Turing Institute [https://www.turing.ac.uk/], was created in his name.

Facts about Alan Turing

- Turing's first day of Sherborne School coincided with the 1926 General Strike but he was so determined to make it in that he cycled 60 miles.
- Turing was often spotted running along the riverside paths between Cambridge and Ely; this is commemorated by an annual race, the Turing Relay which takes place along those tracks.
- Alan Turing is credited with designing the first computer chess program in 1950, named Turochamp.
- Turing was known for his eccentricity at Bletchley Park. His colleagues called him 'Prof' and his treatise on the Enigma was known as 'The Prof's Book'.

Further information about the life of Alan Turing can be found here [http://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-36578?rskey=iE7NF6&result=2] via the Oxford Dictionary of National Biography.

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Name
Alan Mathison Turing
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Gender