

ALAN TURING – THE FATHER OF MODERN COMPUTING

1. Alan Mathison Turing was born on June 23, 1912, in Maida Vale, London. His father, Julius Mathison Turing, was a British civil servant working in India, and his mother, Ethel Sara Turing, was the daughter of a railway engineer. From a young age, Turing exhibited exceptional intelligence and was deeply interested in science, mathematics, and puzzles. During his education at Sherborne School in Dorset, he found the strict classical curriculum challenging and showed a preference for mathematics and science.
2. He formed a close friendship with Christopher Morcom, whose untimely death had a profound impact on Turing. He graduated with first-class honours in mathematics and became a fellow at King's College at age 22, between 1931 and 1934. From 1936 to 1938, he completed his PhD at Princeton University under Alonzo Church, focusing on logic, number theory, and cryptography.
3. His significant contributions and works relate to the 1936 paper on "Computable Numbers, with an application to the Entscheidungs problem". The central idea introduces the Universal Turing Machine, a hypothetical device capable of simulating any algorithm. This foundation established the field of computability theory and theoretical computer science, demonstrating that some problems cannot be solved by any algorithm—known as undecidability.

During 1939 to 1945 at Bletchley Park, Cryptanalysis played a crucial role in World War II. The contribution involved joining the Government Code and Cypher School (GC and CS) at Bletchley Park, where he focused on deciphering Nazi Germany's Enigma Code, which encrypted military communications. His achievements are outlined below.

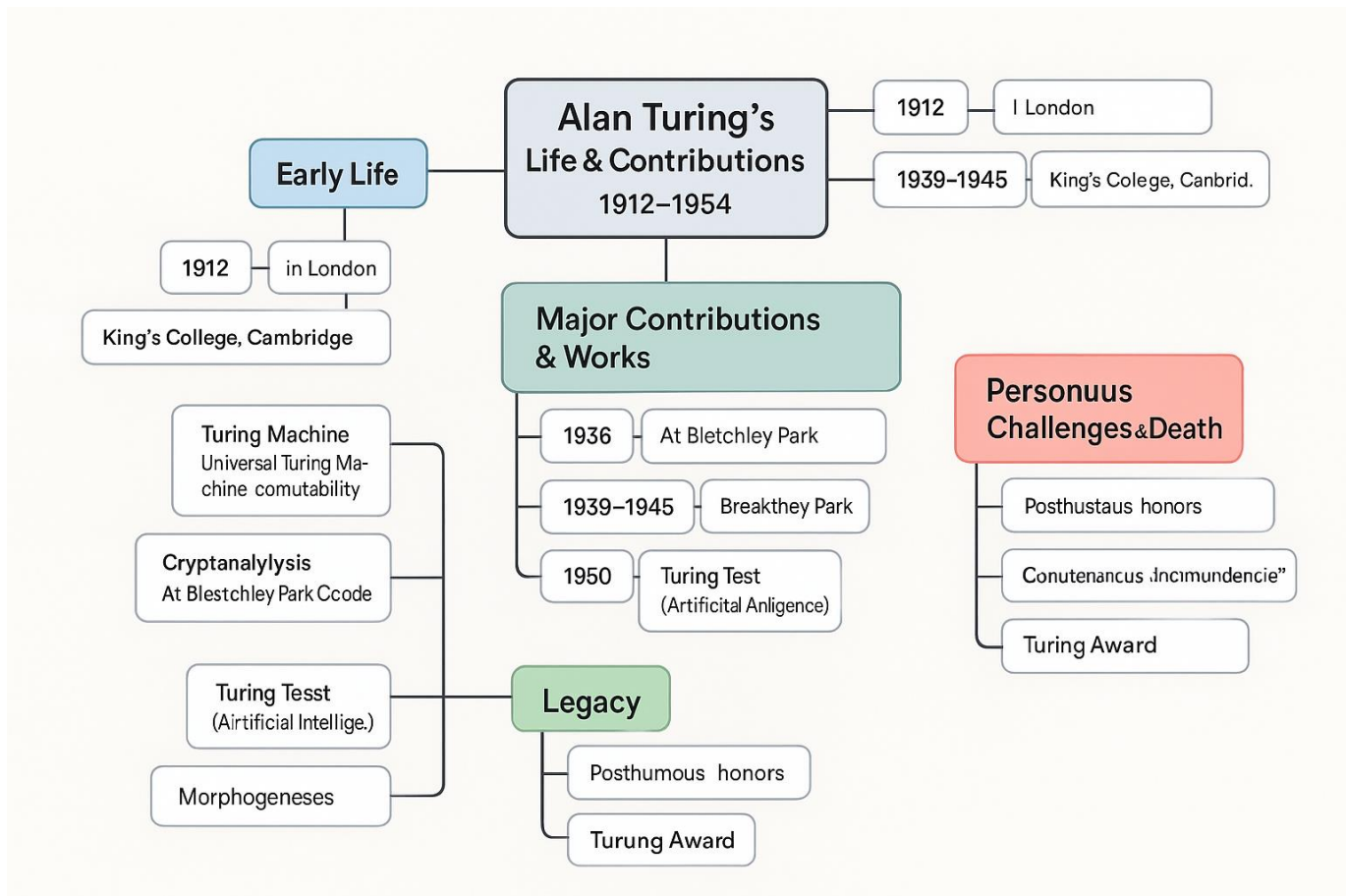
- He created the "Bombe" machine, an electromechanical device that accelerated the decoding process.
- His work is believed to have shortened the war by 2 to 4 years, saving millions of lives.
- He also contributed to breaking the Lorenz Cipher (Tunny machine) used by Hitler's High Command.

The 1950 paper "Computing Machinery and Intelligence" discusses the 'Turing Test'. It introduces the "Imitation Game", now known as the Turing Test, as a method to assess

whether a machine can demonstrate human-like intelligence. This idea was crucial in sparking debates on Artificial Intelligence (AI). Additionally, Morphogenesis from 1952, which includes insights into Mathematical Biology found in “The Chemical Basis of Morphogenesis,” explains how animal patterns like spots and stripes develop via reaction-diffusion systems. His work is regarded as foundational in both theoretical biology and the study of complex systems.

4. Despite facing prosecution for his sexual orientation, Turing's resilience shone through. He chose chemical castration over imprisonment, a decision that was a testament to his strength. His crucial wartime contributions were overshadowed by public ridicule and government surveillance, leading to the revocation of his security clearance and the end of his cryptographic work. He died on July 7, 1954, in Wilmslow, Cheshire, England, from cyanide poisoning, which is widely believed to be a suicide, though some suggest it was accidental. He was found with a half-eaten apple, which is often linked to the poisoned apple in Snow White.
5. Regarding his recognitions and honors, including posthumous apologies and acknowledgments— In 2009, the British government issued an official apology (Prime Minister Gordon Brown). In 2013, Queen Elizabeth II granted a Royal Pardon. By 2019, he was featured on the £50 banknote. Awards named after him include the Turing Award, given annually since 1966 by ACM and known as "The Nobel Prize of Computing." The Alan Turing Institute, established in 2015, is the UK's national center for data science and AI. Biographical works include “Alan Turing: The Enigma” by Andrew Hodges (1983), considered the definitive biography. In 2014, the film “The Imitation Game” brought Turing's story to a broader audience. Benedict Cumberbatch's portrayal of Turing became a symbol of the LGBTQ+ rights movement and the freedom of scientific thought. Turing's life and work continue to inspire and advocate for social progress and inclusivity.
6. Alan Turing's place in history includes –
 - Contribution to computer science, including the concept of the Universal Turing Machine, which forms the foundation of algorithms.
 - During WWII, cryptography played a significant role in successfully breaking Enigma and Lorenz ciphers.
 - Artificial intelligence encompasses the Turing Test, which assesses machine intelligence.

- Mathematical biology includes morphogenesis, which is the mathematical modeling of biological patterns.
- The human rights symbol consists of a victim of persecution and a symbol of LGBTQ+ rights.



Alan Turing is widely regarded as one of the most brilliant minds of the 20th century. His groundbreaking work laid the groundwork for computer science, artificial intelligence, and modern cryptography. Despite his tragic persecution, which reveals societal prejudices, his legacy continues to inspire scientific advancement and champions for equality and justice.

Significant Contributions

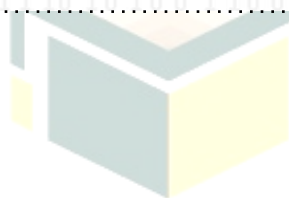
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- The **1950** paper **"Computing Machinery and Intelligence"** discusses the 'Turing Test'.
- Morphogenesis** from **1952**, includes insights into Mathematical Biology.



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