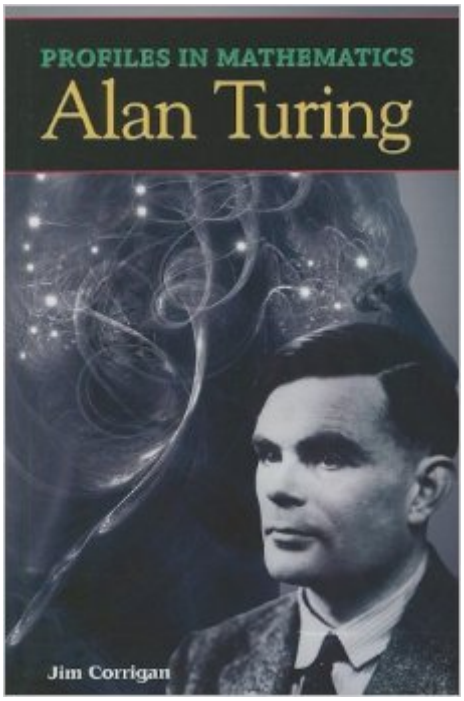
Alan Turing (Profiles In Mathematics)



Synopsis

Book by Corrigan, Jim

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Customer Reviews

Alan Turing's older brother was athletic, got good marks, and studied to become an attorney. At the time, scientific and mathematics were not admired professions - but that didn't stop Alan from pursuing them; he was also somewhat clumsy and unaware of any rules of good dress. In 1930 he received a scholarship to King's College in Cambridge - an impressive accomplishment. Their math department was among the best in England, and in 1935 he was awarded a fellowship there. Soon after he turned his attention to how a machine might simulate human thinking, then cryptography in 1937 while at Princeton. The following year he was awarded a doctoral degree and offered a position - Turing declined, wanting to return to England. There he went to work for their Code and Cypher School. Slightly more than a year later, Germany invaded Poland.German cryptographers were convince their code (Enigma) could not be broken. Both sender and receiver needed an Enigma machine and had to ensure the rotor settings of both matched. The Enigma machine had been invented in 1923 and made available for purchase around the world. Each machine contained three rotors, and each rotor had 26 different settings. Thus, the trio of rotors could be placed in any

of 17,576 different configurations. The German military made their machines even more complex by introducing two additional rotors. Only three at a time could be used, but the British analysts had no way of knowing which three were being used. They also added a plug-board with 26 jacks into which cables could be plugged - raising the combinations to over 1 trillion.Previously Policy analysts had learned that Enigma would never encode a letter as itself, and that German operators routinely included clues about the rotor setting they were using at the start of each message to ensure the intended recipient had correct rotor settings. The Poles also built electrical machines (bombes) to simulate each rotor setting.In 1940, Bletchley Park decrypted only 273 German Enigma, 1,344 in 1941, and 4,655 in 1942. German commanders started to suspect their system might have been comprised and ordered a series of modifications to thwart such. British analysts had to resort to trial-and-error methods to adjust. Turing wanted to quantify the probability of success of each potential solutions so the likeliest solutions could be tried first - a process today known as sequential analysis.Bletchley Park built 60 bombes, but it still could take several days to find correct rotor settings for a particular message. Turing suspect a way to move faster was by exploiting Germany's blind faith in Enigma. Overuse of identical wording leaves messages vulnerable to 'probable-word attack.' Germans often ignored this basic rule - eg. methodically including "Heil Hitler!' in every message and routine repeating long phrases such as 'The weather forecast for today . . . ' Turing designed the British bombes to look for probable words and phrases.The bombes were about the height/weight of a large refrigerator and twice as wide; each contained slots for 108 Engima-like rotors and required skilled workers to look after them. Turing et al grew so desperate they mailed a request directly to Churchill who directed compliance.After WWII, Turing turned to efforts to build a brain and developed a chess program using decisions trees and numerical values for the various outcomes.

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