The role of alan turing in the history of computing

Science, Biology

The role of Alan Turing in the history of computing Alan Mathison Turing was born on 23 June 1912, Paddington, London. He was a true pioneer in computerscienceand if it were not for this man, no one would probably be typing an essay based on him on a modern computer. He is renowned for his passion ofmathematicsand the invention of the Turing machine/test, breaking the German enigma code during World War One, and for making the first automated computing machine (the ACE).

At an early age he was sent to preparatory school by his parents, he attended these until enrolling at Sherbourne in 1926. His teachers there were surprised to find him working through the long way for the answers to questions, after Sherbourne Turing enrolled at King's College where he became a mathematics scholar in 1931 where he began his studies in maths and logistics. He was elected at King's and won the Smith's award in 1936 for a paper he wrote on the " Gaussian error function", this is when he began work to develop The Turing Machine. Copeland, 2004) But later in 1936 he moved to the United States to study at Princeton for two years where he studied the theory of computation and in 1937 presented a paper called " On computable numbers, with an application to the " Entscheidungs problem" and soon to challenge David Hilbert's three questions put forward to the best of the mathematical minds, which were; Was maths complete? Was maths constant? , was maths decidable? (Hodges, 1992; Copeland 2004).

Though his work on the Entscheidungs problem he began working on to define what a method was, and through that he came up with the Turing machine theory which can be said to be a mechanical process that was able to perform all the operations a person working with a logical system would

be able to perform this theory compares human thought processes to that of a machine, which in the Turing machine theory are categorized as terms of inputs, outputs and machine states.

The Turing machine is a simple computer. It’s limited to a logical set of instructions by reading and writing symbols on a tape and moving the tape one step to the left or right and then look at what’s written in the resulting square, each symbol had a specific way to be turned into a new symbol e. g. if the symbol is a “ 0” move it two spaces right and turn it into a “ 1”. So a algorithm for a calculation the list of instructions are quite long, but the complexity of instructions are very short.

The Turing Machine at the time was the only one designed to perform multiple tasks and functions. Turing’s vision was what we currently use today as a modern computer (Copeland, 2012). Soon after this period World War two began and the Polish were bracing themselves from an invasion from the Germans, When Polish mathematician Marian Rejewski attempted to break the German enigma machine which is a mechanical ciphering machine which had the purpose of a message only being read and understood by the receiver.

Marian made the polish bomby which works like a combination of many enigma machines e. g. if SAW stood for GJK then both would be put in the bomby and every possible combination would be sorted through and would stop when a possible match was found, this worked well until 1938 when Germany added two more rotors to the Enigma (Schmidl, 1998), sadly the Polish had to leave Poland and forced to team up with the English and French

and this where Alan Turing’s true genius was put into application and saved hundreds and thousands of lives.

Turing then put the Polish’s efforts into action, the British had a lot more resources which consisted of about ten thousand people working on the encoding of the Enigma, Turing created The Turing Bombe which was a lot more efficient than the bomby and it differed in the way that instead of trying to rely on a certain indicator decode a certain message sent, it went after the specific message using word probability.

Once the message was solved a ’menu’ was put on the bombe and was then put in its proper setting, was given information and let it run until it matched with the rotors, Three to Seven months later a set of three rotors were place in the scrambler unit, this made the processing a lot faster as the scrambler unit made the current go from the fast, medium then the slow rotor.

Eventually the codes made by the Germans became clearer and they lost their advantage in World War two, and the U boats who were sinking the supply ships from America and Canada to Great Britain, could not locate the supply ships for the first 23 days of June 1941 (Kozaczuk, 1984). After World war two Turing went to work for the National Physical Laboratory in 1945 where he made the first plan for the first Automated Computing Machine for the Association for Computing Engineering (the ACE). Unfortunately the ACE was never completed as he moved to the University of Manchester to develop an even more advanced computing machine (MADAM).

With all of Turing’s work he had proved David Hilbert wrong with all three questions with the fact that a certain class of mathematical problems which

could not be solved by automatic machines and had introduced the concept of a single theoretical universal computing machine, which of course is now known as the Turing Machine. In 1947 he tried to find out if there was any relationship with computers and nature and Turing was certain that by about the year 2050 that a thinking machine would mimic the thoughts of a human and it was in 1949 he published a paper called “ intelligent machines” (Copeland, 2005)

Alan Turing passed away on 7 June 1954, he was found in his bed with an half eaten apple beside his bed, which was apparently dipped in cyanide on purpose by himself so he could commitsuicideas he was supposedly depressed after being found guilty of homosexuality by the British courts. But there is little evidence to support this theory of Turing committing suicide (Pease, 2012). Bibliography Schmidl, H. , (1998) On Enigma and a Method for its Decryption http://www. cs. miami. edu/~harald/enigma/index. html Kozaczuk, W. (1984), Enigma: How the German Machine Cipher Was Broken, and How It Was Read by the Allies in World War Two, (2nd ed.), Frederick, Maryland: University Publications of America. Hodges, A. , (1992), Alan Turing: the enigma, London: Burnett Books. P. 26-34. Copeland, B. J. , (2004) The Essential Turing. Oxford: Oxford University Press Pease, R. , Alan Turing: Inquest's suicide verdict 'not supportable' (June 26, 2012). , BBC News, science andenvironment. Copeland, B. J. , Alan Turing. net, the Turing archive for the history of computing (2012).