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**CSIS 1800: Introduction to Computer Science and Information Systems**

**Chapter number: 1**

**Assignment number: 1**

1. Describe Babbage's contribution to the history of computers.

Charles Babbage is considered the father of computer science. He is credited as such due mainly to his invention of the “first difference engine” which was a hand-operated mechanical calculator capable of complex mathematical calculations. He cemented his status as the father of computers by designing powerful computers he called “analytical engines”. His designs contained, processors, control units, memory and input/output system which are the four essential part of today’s mathematical computer. Due to technological limitations of his time his “second difference engine” was first built in 1991 by the Science Museum in London and later another one was built and placed in the computer History Museum in California.

1. Who was considered to be first programmer? What was his/her contribution?

Ada Lovelace is considered the first programmer because of the programs she developed for Charles Babbage’s machines. She foresaw that such machines could go beyond arithmetic computations and become a general manipulator of symbols. She also foresaw that the machines would eventually be programmed with rules of harmony and composition so that it could produce “scientific” music, effectively predicting the field of artificial intelligence. Using Luigi Menabrea’s written account of Babbage’s lectures on his Analytical Engine, Ada wrote “The Sketch of the Analytical Engine”, the definitive work on the subject.

1. Describe four important facts about:
2. The first generation of hardware:

The first important fact about the first generation of hardware (1951-1959) is that commercial computers were built using vacuum tubes to store information. Second fact is that the primary memory device was a magnetic drum that rotated under a read/write head. The third fact is that punch cards were used as input devices. The last fact is that magnetic tape drives were developed.

1. The second generation of hardware:

The first important fact about the first generation of hardware (1959-1965) is that the transistor was introduced replacing vacuum tubes. The second fact is the introduction of Immediate-access memory through the use of magnetic cores. Third we had the new auxiliary storage device, the magnetic disk. Lastly is that prior mentioned technologies all were faster and smaller thus more efficient than their predecessors

1. The third generation of hardware:

The first important fact about the first generation of hardware (1965-1971) is that integrated circuits were introduced replacing printed circuits. Second we have the introduction of operating systems which could ease user interactivity. Third was the ability of computers to perform multiprogramming, allowing computers to do multiple task simultaneously. Lastly is the ability for users to interact with computers via keyboards, monitors and interfaced

1. Distinguish between machine language and assembly language.

Machine language is the set of instructions built into the electrical circuitry of a particular computer. Machine language is time consuming and prone to error so programmers developed Assembly language to help with the programming process. Assembly language uses mnemonic codes to represent each machine-language instruction. An Assembler is used as a translator between machine and assembly language.

1. Distinguish between assembly language and high-level languages.

Assembly language uses mnemonic codes to represent each machine-language instruction, forcing programmers to think in terms of individual machine instructions. High-level language allows programmers to write instructions using more English-like statement thus facilitating the development of complex software applications

1. FORTRAN and COBOL were two high-level languages defined during the second generation of computer software. Compare and contrast these languages in terms of their history and their purpose.

While FORTRAN was designed to suite numerical applications COBOL was designed for business applications. FORTRAN started out as a simple language and then grew into a more sophisticated language as additional features were added to it over the years. COBOL was designed first and then implemented with minimal change over time.

1. Distinguish between a systems programmer and an applications programmer.

System programmers is a title reserved for programmers that develop tools such as compilers and assemblers while application programmers is a title reserved for programmers that used such tools to develop programs. Today the separation between system and application programmers is accented by the emergence of extremely sophisticated software.

1. What was the rationale behind the development of operating systems?

The rationale behind the development of operating systems is that humans were slowing down the computing process. It was observed that computers were sitting around waiting for a human operator to delegate the next job. Hence the idea to put the computer resources under the control the computer.

1. What constitutes systems software?

The components that constitute system software are utility programs like loaders and linkers, the operating system, and the language translators like assemblers and compilers.

1. What do the following pieces of software do?
   1. Loader

A Loader is responsible for the loading of programs into memory.

* 1. Linker

A Linker is responsible for the linking of pieces of large programs together.

* 1. Editor

An Editor is a text editor program used by programmers to edit source code.

References:

1. http://linguapress.com/advanced/babbage.htm
2. Dale and Lewis, *Computer Science Illuminated*, p. 13-14
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4. Dale and Lewis, *Computer Science Illuminated*, p. 18
5. Dale and Lewis, *Computer Science Illuminated*, p. 18-19
6. Dale and Lewis, *Computer Science Illuminated*, p. 19
7. Dale and Lewis, *Computer Science Illuminated*, p. 19
8. Dale and Lewis, *Computer Science Illuminated*, p. 20
9. Dale and Lewis, *Computer Science Illuminated*, p. 20-21
10. https://en.wikipedia.org/wiki/Source\_code\_editor