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TOPLC: Computer Architecture

GITHUP LINK: https://github.com/mohamedhussein12/html-project-New-Repository

GITHUP PAGE(website): https://mohamedhussein12.github.io/html-project-New-Repository/index.html

Approved by:

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APPLICATION BRIEF:

- computer architecture is a set of rules and methods that describe the functionality, organization, and implementation of computer systems. Some definitions of architecture define it as describing the capabilities and programming model of a computer but not a particular implementation. In other definitions computer architecture involves instruction set architecture design, microarchitecture design, logic design, and implementation.
- Computer architecture is a specification describing how hardware and software technologies interact to create a computer platform or system. When we think of the word architecture, we think of building a house or a building. Keeping that same principle in mind, computer architecture involves building a computer and all that goes into a computer system. Computer architecture consists of three main categories

  System design – This includes all the hardware parts, such as CPU, data processors, multiprocessors, memory controllers and direct memory access. This part is the actual computer system.

  Instruction set architecture – The includes the CPU's functions and capabilities, the CPU's programming language, data formats, processor register types and instructions used by computer programmers. This part is the software that makes it run, such as Windows or Photoshop or similar programs.

Microarchitecture – This defines the data processing and storage element or data paths and how they should be implemented into the instruction set architecture. These might include DVD storage devices or similar devices

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Computer engineering (CE) is a branch of engineering that integrates several fields of computer science and electronic engineering required to develop computer hardware and software.Computer engineers usually have training in electronic engineering (or electrical engineering), software design, and hardware-software integration instead of only software engineering or electronic engineering. Computer engineers are involved in many hardware and software aspects of computing, from the design of individual microcontrollers, microprocessors, personal computers, and supercomputers, to circuit design. This field of engineering not only focuses on how computer systems themselves work but also how they integrate into the larger picture. Computer systems fall into essentially two separate categories. The first, and most obvious, is that of the desktop computer. When you say "computer" to someone, this is the machine that usually comes to her mind. The second type of computer is the embedded computer, a computer that is integrated into another system for the purposes of control and/or monitoring. Embedded computers are far more numerous than desktop systems, but far less obvious. Ask the average person how many computers he has in his home, and he might reply that he has one or two. In fact, he may have 30 or more, hidden inside his TVs, VCRs, DVD players, remote controls, washing machines, cell phones, air conditioners, game consoles, ovens, toys, and a host of other devices. Both have a processor, memory, and often several forms of input and output. The primary difference lies in their intended use, and this is reflected in the system design and their software. Desktop computers can run a variety of application programs, with system resources orchestrated by an operating system. By running different application programs, the functionality of the desktop computer is changed. One moment, it may be used as a word processor; the next it is an MP3 player or a database client. Which software is loaded and run is under user control. In contrast, the embedded computer is normally dedicated to a specific task. In many cases, an embedded system is used to replace application-specific electronics. The advantage of using an embedded microprocessor over dedicated electronics is that the functionality of the system is determined by the software, not the hardware. This makes the embedded system easier to produce, and much easier to evolve, than a complicated circuit. What do you mean by computer architecture? Computer architecture in computer engineering is a collection of laws and techniques describing software systems features, organisation, and execution. Some architecture terms describe it as defining a computer's capacities and programming model, but not a specific execution.

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Advantages of computer Architecture	disadvantages of computer Architecture
1-Multitasking is one of the major advantage of computer. Person can perform multiple task, multiple operation, calculate numerical problems within few seconds. Computer can perform trillion of instructions per second.	1-Virus is a worm and hacking is simply an unauthorized access over computer for some illicit purpose. Virus is being transferred from email attachment, viewing an infected website advertisement, through removable device like USB etc. once virus is transferred in host computer it can infect file, overwrite the file etc.
- 2-Now computer is not just a calculating device. Now a day's computer has very important role in human life. One of the main advantages of computer is its incredible speed, which helps human to complete their task in few seconds. All the operations can be performed very fast just because of its speed elsewise it takes a long time to perform the task.	2-Online cyber-crime means computer and network may have used in order to commit crime. Cyberstalking and Identity theft are the points which comes under online cyber-crimes. For example: one may get the access of the access to your shopping account like amazon account now that person will be able to know your personal details like debit card or credit card number which can be than misused.
3-It is a low cost solution. Person can save huge data within a low budget. Centralized database of storing information is the major advantage that can reduce cost.	3-Mainly past generation was not used of the computer or they have the knowledge of computer they faced a big problem when computer came in field. As we have seen in banking sector senior bank employees faced this problem when computer came to the banking sector.
4-One of the root advantage of computer is that can perform not only calculations but also with accuracy.	4-When there are frequent simultaneous client requests, server severely get overloaded, forming traffic congestion.
5-Computer Technology helps to keep in contact with our family and re-connect with old friends or make new friends by using any services such as Facebook, Viber, WhatsApp, Skype and many more. People are using online dating to socialise and connect with others also.	5-Thinking ability. Stops us from thinking about solving problems.

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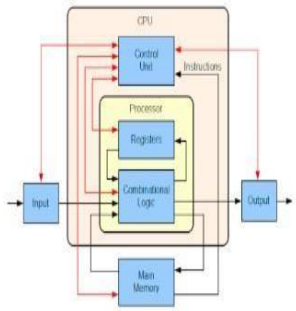

In computer engineering, computer architecture is a set of rules and methods that describe the functionality, organization, and implementation of computer systems. Some definitions of architecture define it as describing the capabilities and programming model of a computer but not a particular implementation.[1] In other definitions computer architecture involves instruction set architecture design, microarchitecture design, logic design, and implementation. Computer architecture is concerned with balancing the performance, efficiency, cost, and reliability of a computer system. The case of instruction set architecture can be used to illustrate the balance of these competing factors. More complex instruction sets enable programmers to write more space efficient programs, since a single instruction can encode some higher-level abstraction (such as the x86 Loop instruction)However, longer and more complex instructions take longer for the processor to decode and can be more costly to implement effectively. The increased complexity from a large instruction set also creates more room for unreliability when instructions interact in unexpected ways. The implementation involves integrated circuit design, packaging, power, and cooling. Optimization of the design requires familiarity with compilers, operating systems to logic design, and packaging. ardware. Computer architects must design a computer to meet functional requirements as well as price, power, performance, and availability goals. summarizes requirements to consider in designing a new computer. Often, architects also must determine what the functional requirements are, which can be a major task. The requirements may be specific features inspired by the market. Application software often drives the choice of certain functional requirements by determining how the computer will be used. If a large body of software exists for a certain instruction set architecture, the architect may decide that a new computer

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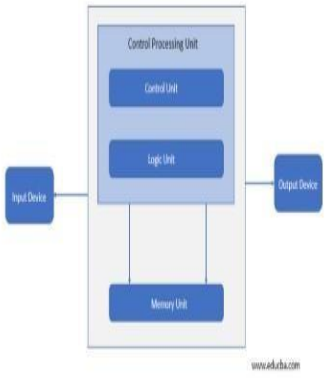
Fetch: An instruction and the necessary data are obtained from memory. Decode: The instruction and data are separated, and the components and pathways required to execute the instruction are activated. Execute: The instruction is performed, the data is manipulated, and the results are stored. This pattern is typically implemented by separating the task into two components, the control, and the datapath. The control unit reads the instruction, and activates the appropriate parts of the datapath. The datapath is the route of the microprocessor. The command buttons of the control unit allow the data to be manipulated in specific, as the data move in multiple parts of the datapath according to the instructions. The data path includes the data transformation loop and the provisional data storage system. It involves ALUs which can convert data through the addition, subtraction, logic AND, OR, reversal and modification The memory of Harvard's Architecture based computer system is divided into two These two parts are: Information Instructions The two distinct memories occupy distinct memory modules in a pure Harvard system, and instructions can only be performed from the memory of the instructions. Many DSPs are modified Harvard architectures, designed to simultaneously access three distinct memory areas: the program instructions, the signal data samples, and the filter coefficients (often called the P, X, and Y memories). Modern Computers The recent variants, though with "Harvard-like" features, are nonetheless non-Harvard pcs, especially Intel x86-based ISA-based pcs. The same RAM areas contain all information, program guidelines and data. However, a modern feature called "pages" allows physical memory to be segmented into "pages" large memory blocks. Each page may be directions or information but not both. Modern embedded computers, however, are usually focused on Harvard architecture. Instructions are placed in a different memory compartment and the microprocessor has no manner of



exchanging information and directions.