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## VARIOUS WAYS FOR IMPROVING THE SYSTEM PERFORMANCE

**Dr. K. Venkateswara Rao[*1], Dr. O. Rama Devi[2], P. Yasaswini[3] & V. Sravanthi[4]**
[*1]Assoc.Prof, Dept,of CSE, LBRCE,Mylavaram, Krishna(dt),AP
[2]Professor, Dept,of CSE, LBRCE,Mylavaram, Krishna(dt),AP
[3&4]III CSE, Dept,of CSE, LBRCE,Mylavaram, Krishna(dt),AP

### ABSTRACT
System performance plays a major role in efficient working of computing device.In order to achieve high system performance there are manyways.Some of them are parallel processing and pipelining.System performance depends on various factors such as number of instructions given to it and better memory organization.In addition to parallel processing and pipelining, there are many other ways to improve the performance of a computer. This paper gives a brief explanation on the ways of improving system performance.

## I. INTRODUCTION

When we use instruction cycle approach or interrupt cycle approach to execute any program the performance may degrade because in instruction cycle we follow sequence approach of fetch, decode, execute, and write. When the number of instructions are to be performed, each and every     instruction passes through all the four steps and execute in one after the other pattern. In interrupt cycle the normal flow of the execution gets interrupted by the interrupt signal and the current execution is kept ideal and the execution process branches to some other place. Hence the delay of execution occurs and the program completion may take longer.

## II. FACTORS THAT INFLUENCE THE SYSTEM PERFORMANCE:-

Each and every instruction given to the computer can be assumed as a cycle then number of cycles are increased in a program execution system runs longer in order to complete the task.Hence, performance degrades.

No.of cycles = no.of instructions

This assumption can be incorrect,
- different instructions take different amount of time on different machines.
- memory access might require more circles than other instructions.
- floating point instructions might require multiple instructions to execute.
- branches might stall execution state.

**Ways to improve system performance**
Inorder to improve the performance of a system we can either
- decrease the number of required cycles for a program.
- decrease the clock cycle time.
- decrease the average clock per instruction.
- increase the clock rate(reduce propagation delays or use pipeline).

**Performance analysis**
A basic performance equation:     $T = (N*S)/R$
T-processor time required to execute the program.
N-actual number of machine instructions(including that due to loops).
S-average number of cycles/instruction.
R-cycle/sec.

Earlier measures:
- IPC = instruction per cycle = 1/CPI.
- -CPU execution time for program =
Instruction count * CPI * clock cycle time.

**Factors that influences CPU performance:**
- reduced power dissipation
- reduced space area
- more increase in speed and registers(GPRS)for operation
- more memory size
- use of cache
- set of cores on CPU
- pipelining

**Increase in CPU performance**
- increase in clock rate
- improvement in processor design to lower CPI
- compiler enhancements for lower average CPI
- better memory organization

The system architecture consists of instruction set, addressing modes, register, virtual memory etc. They influence performance according to the programmer view point. CPU, buses, physical memory,caches,pipelines etc. They influence the performance according to the architectural view point

The von Neumann computer system architecture has gone through many evolutional changes and improvements inorder to enhance the performance.

The new techniques to improve performance are pipelining and parallel processing.

## III.    PIPELINING

Pipelining is an efficient way to offer parallelism in computer systems.During any given time,each stage of the pipeline will be doing computation on a sub task that is belonging to a different task.In reality,the time required to finish the processing of a single task is increased because of the buffering needed between the pipeline stages,but since many tasks are performed simultaneously through pipeline by overlapping the task completion rate is much higher compared to the sequential execution of tasks(1,2,3,4)

It has its own limitations such as interrupt overhead,control hazard, structural hazard,collision handling etc.

**Advantages of pipelining**
1. The cycle time of the processor is reduced; increasing the instruction throughput. Pipelining doesn't reduce the time it takes to complete an instruction; instead it increases the number of instructions that can be processed simultaneously ("at once") and reduces the delay between completed instructions (called 'throughput').
   The more pipeline stages a processor has, the more instructions it can process "at once" and the less of a delay there is between completed instructions. Every predominant general purpose microprocessor manufactured today uses at least 2 stages of pipeline up to 30 or 40 stages.
2. If pipelining is used, the CPU ALU can be designed faster, but more complex.
3. Pipelining in theory increases performance over an un-pipelined core by a factor of the number of stages (assuming the clock frequency also increases by the same factor) and the code is ideal for pipeline execution.

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4. Pipelined CPUs generally work at a higher clock frequency than the RAM clock frequency, increasing computers overall performance.

## IV.    CONCLUSION

In addition to the above various ways of improving the systems performance, we can also do the following to improve the Performance of our system.

1. **We have to be aware that the majority of the system issues are effected due to infections, spywares and the registry over-burden:** If care is taken to do regular upkeep checks, this can be balanced out and problems dealt with and removed. Windows PCs tend to slow down as applications are introduced and utilized. Whether you are utilizing a processor, a spreadsheet, surfing the web, playing games or whatever else, hard drives loaded up with makeshift documents that don't generally get evacuated when no longer required will slow down considerably. Hard drives can succumb to wear and tear over time as well.

2. **Keep the system clean:** Filling up the entire hard drive with junk data will cause your computer to crawl. It's always better to Remove/Delete the unwanted Data/Information. We have to ensure that there is always some space left in the Hard disk drive. In order to improve your systems performance you can upgrade your systems RAM capacity. Cleaning out the system is a good starting option, as junk has no place on your computer.

3. **Delete temporary files:** It's better to clean out the temporary files. Deleting temporary documents is a simple task that can help free up drive space and keeps your PC free of document mess.

4. 4.**Uninstall/Delete the unused programs/files:** If you have decided to stop using a program, always remove it from your Add or Remove Programs function in the Control Panel. Similarly if there is any file/document, which is Least Recently Used or if not at all used, then simply delete the file/document.

5. **Delete the Browser History:**It's better to delete the browsing history. This consists of  website addresses that you visited,  Internet files, cookies, and information that you have searched for. So by deleting the browser history, you can get some free space and you can increase the Speed of your system.

6. **Partition the Hard Disk:**It's preferred to partition the Hard disk, rather having single partition.

7. **Do Regular Check:** It is recommended to check/scan for virus regularly. By doing this we can identify the virus if any in the initial stage itself.

8. **Be Particular about your Anti-Virus software:** You should be cautious about the Anti-Virus software you are using. Because there is always chance of getting your system effected by Viruses. So if you have Good Anti-Virus software, you can avoid from these viruses.

9. **Disconnect internet if any virus is suspected:**If any Virus is suspected, immediately disconnect the system with internet connection and then detect the virus and remove it.

10. **Install Ad Blocker:** Adblocker is the best way to get rid of annoying ads, online tracking and to protect your computer from malware and phishing.

11. **Update your drivers:** A driver is software that allows your computer to communicate with hardware devices. Without drivers, the devices you connect to your computer would not work properly. You can automatically update. Windows can automatically check if there are drivers available for new devices that you connect to your computer.

12. **Cool your machine:** Sometimes your computer suddenly starts operating very slowly, it happens due to over hot. Especially in hot climates, make sure that the computer has adequate airflow around it. Overheating causes myriad difficulties. It can also damage the inner parts likethe processor, battery, and hard drive. If you use the system at high temperatures for a lengthy period of time it can leads to drive failure. Hard drive failure rates may increase around 20%-30% for each 10 degrees above recommended working temperatures. In order to avoid the above it is recommended to use the system in cool temperature.

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