

Punjab Technical University

B.Tech. – Computer Science & Engineering (Sem. – 6th)

Real Time Systems

Subject Code: CS-324

2 Mark Questions:-

Q:-1) What is Cache? List the different types of cache. (May 2012)

Ans:-1) **Cache**: - Pronounced *cash*, a special high-speed storage mechanism. It can be either a reserved section of main memory or an independent high-speed storage device.

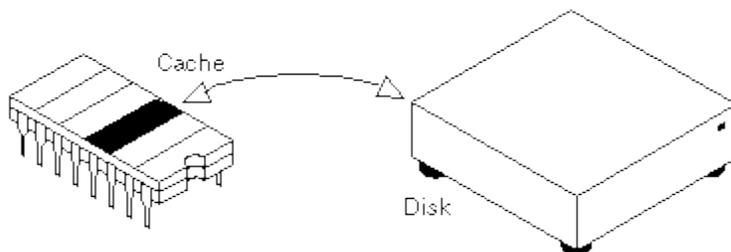
Two types of caching are commonly used in personal computers:

Memory caching and Disk caching

A **memory cache**, sometimes called a *cache store* or *RAM cache*, is a portion of memory made of high-speed static RAM (SRAM) instead of the slower and cheaper dynamic RAM (DRAM) used for main memory. Memory caching is effective because most programs access the same data or instructions over

and over. By keeping as much of this information as possible in SRAM, the computer avoids accessing the slower DRAM.

Disk caching works under the same principle as memory caching, but instead of using high-speed SRAM, a disk cache uses conventional main memory. The most recently accessed data from the disk (as well as adjacent sectors) is stored in a memory buffer. When a program needs to access data from the disk, it first checks the disk cache to see if the data is there. Disk caching can dramatically improve the performance of applications, because accessing a byte of data in RAM can be thousands of times faster than accessing a byte on a hard disk.



Q:-2) Define Virtual Memory and its Advantages? (May 2012)

Ans:-2) Virtual memory is a feature of an operating system that enables a process to use a memory (RAM) address space that is independent of other processes running in the same system, and use a space that is larger than the actual amount of RAM present, temporarily relegating some contents from RAM to a disk, with little or no overhead.

Q:-3) What is 2 Stage Pipeline? (May 2012)

Ans:-3) Pipelining: - A technique used in advanced microprocessors where the microprocessor begins executing a second instruction before the first has been completed. That is, several instructions are in the *pipeline* simultaneously, each at a different processing stage.

A similar technique used in DRAM, in which the memory loads the requested memory contents into a small cache composed of SRAM and then immediately begins fetching the next memory contents. This creates a **Two-stage pipeline**, where data is read from or written to SRAM in one stage, and data is read from or written to memory in the other stage.

Q:-4) What is Software Reliability? (May 2012)

Ans:-4) Software reliability is a field of testing in which deals with testing software's ability to function under given environmental conditions for a particular amount of time. Software reliability testing helps discover many problems in the software design and functionality. Once these problems are discovered and corrected, it provides assurance that the software is in its best possible condition.

Q:-5) Enumerate Applications of Real Time Databases? (Dec. 2012)

Ans:-5) A Real-Time database is a processing system designed to handle workloads whose state is constantly changing. This differs from traditional

databases containing persistent data, mostly unaffected by time. For example, a stock market changes very rapidly and is dynamic.

Real-time processing means that a transaction is processed fast enough for the result to come back and be acted on right away

Real-time databases are useful for **Accounting, Banking, Law, Medical records, Multi-media, Process control, Reservation systems, and Scientific data analysis.**

Q:-6) Explain Audit Trails? (Dec. 2012)

Ans:-6) A record showing who has accessed a computer system and what operations has performed during a given period of time. **Audit trails** are useful both for maintaining security and for recovering lost transactions. Most accounting systems and database management systems include an audit trail component.

Q:-7) Explain Reliability? (Dec. 2012)

Ans:-7) Reliability (engineering) and also a branch of statistics, the ability of a system or component to perform its required functions under stated conditions for a specified period of time.

Q:-8) Explain Performability? (Dec. 2012)

Ans:-8) Performability improves upon the traditional measures by explicitly and formally accounting for the fact that the performance of a real time computer should be tied to the consequent performance of the process that it controls the controlled process is defined as having several accomplishment levels.

Q:-9) Define ACID properties of DBMS? (Dec. 2012)

Ans:-9) ACID stands for

- Atomicity
- Consistency
- Isolation
- Durability

Atomicity

Modification on the data in the database either fail or succeed. The beginning of such a modification starts with a transaction and ends when a transaction finishes (either by a commit or a rollback). A software crash entails an implicit rollback.

Consistency

Only valid data (valid according to integrity constraints) may be committed.

Isolation

One transaction does not interfere with another. The 'executor' of a transaction has the feeling that he has the entire database for himself.

Durability

A committed transaction will not be lost.

Q:-10) Define Real Time Systems? (May 2010)

Ans:-10) A **Real-Time system** is one that must process information and produce a response within a specified time, else risk severe consequences, including failure. That is, in a system with a real-time constraint it is no good to have the correct action or the correct answer after a certain deadline: it is either by the deadline or it is useless.

Q:-11) Define Token Based protocols? (May 2010)

Ans:-11) **Token based protocols** (token ring and token bus) are essentially contention-free protocols. They rely on coordination among stations.

- Under light load, few stations want to transmit. But they still have to wait for token to pass around. Token based protocol perform poorer than contention based protocol such as Ethernet at light load.

- Under heavy load, all stations want to transmit, thus coordination can avoid collision. Token based protocol performs better than contention based protocol such as Ethernet.

Q:-12) What is Scheduling Analysis? (May 2010)

Ans:-12) The term **Scheduling Analysis** in Real-Time Computing includes the analysis and testing of the scheduler system and the algorithms used in Real-Time applications.

In Computer Science, Real-Time Scheduling Analysis is the evaluation, testing and verification of the scheduling system and the algorithms used in Real-Time operations. For critical operations, a Real-Time system must be tested and verified for performance.

Q:-12) What are the applications of Real Time Systems? (Dec. 2010)

Ans:-12) APPLICATIONS OF REAL-TIME SYSTEMS

Industrial Applications: Industrial applications constitute a major usage area of real-time systems. A few examples of industrial applications of real-time systems are: process control systems, industrial automation systems, SCADA applications, test and measurement equipment, and robotic equipment.

Peripheral Equipment: A few examples of peripheral equipment that contain embedded real-time systems are: laser printers, digital copiers, fax machines, digital cameras, and scanners.

Automotive and Transportation: A few examples of automotive and transportation applications of real-time systems are: automotive engine control systems, road traffic signal control, air-traffic control, high-speed train control, car navigation systems, and MPFI engine control systems.

Telecommunication Applications: A few example uses of real-time systems in telecommunication applications are: cellular systems, video conferencing, and cable modems.

Internet and Multimedia Applications: Important uses of real-time systems in multimedia and Internet applications include: video conferencing and multimedia multicast, Internet routers and switches.

Defense Applications: Typical defense applications of real-time systems include: missile guidance systems, anti-missile systems, satellite-based surveillance systems.

Q:-13) What are Main Memory Databases? (Dec. 2009)

Ans:-13) Main Memory Database System is a database management system that primarily relies on main memory for computer data storage. It is contrasted with database management systems which employ a disk storage mechanism. Main memory databases are faster than disk-optimized databases since the internal optimization algorithms are simpler and execute fewer CPU instructions. Accessing data in memory eliminates seek time when querying the data, which provides faster and more predictable performance than disk.

In applications where response time is critical, such as telecommunications network equipment and mobile advertising networks, main memory databases are often used.

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