

Chapter 1 – Computer Systems Overview

TRUE/FALSE QUESTIONS:

1) The processor controls the operation of the computer and performs its data processing functions.

Answer: True False

2) It is not possible for a communications interrupt to occur while a printer interrupt is being processed.

Answer: True False

3) A system bus transfers data between the computer and its external environment.

Answer: True False

4) Cache memory is invisible to the OS.

Answer: True False

5) With interrupts, the processor can not be engaged in executing other instructions while an I/O operation is in progress.

Answer: True False

6) Digital Signal Processors deal with streaming signals such as audio and video.

Answer: True False

7) The fetched instruction is loaded into the Program Counter.

Answer: True False

8) Interrupts are provided primarily as a way to improve processor utilization.

Answer: True False

9) The interrupt can occur at any time and therefore at any point in the execution of a user program.

Answer: True False

10) Over the years memory access speed has consistently increased more rapidly than processor speed.

Answer: True False

11) An SMP can be defined as a stand-alone computer system with two or more similar processors of comparable capability.

Answer: True False

12) The Program Status Word contains status information in the form of condition codes, which are bits typically set by the programmer as a result of program operation.

Answer: True False

13) An example of a multicore system is the Intel Core i7.

Answer: True False

14) In a two-level memory hierarchy the Hit Ratio is defined as the fraction of all memory accesses found in the slower memory.

Answer: True False

15) The operating system acts as an interface between the computer hardware and the human user.

Answer: True False

MULTIPLE CHOICE QUESTIONS:

1) The four main structural elements of a computer system are:

- A) Processor, Main Memory, I/O Modules and System Bus
- B) Processor, I/O Modules, System Bus and Secondary Memory
- C) Processor, Registers, Main Memory and System Bus
- D) Processor, Registers, I/O Modules and Main Memory

Answer: A

2) The _____ holds the address of the next instruction to be fetched.

- A) Accumulator (AC)
- B) Instruction Register (IR)
- C) Instruction Counter (IC)
- D) Program Counter (PC)

Answer: D

3) The _____ contains the data to be written into memory and receives the data read from memory.

- A) I/O address register
- B) memory address register
- C) I/O buffer register
- D) memory buffer register

Answer: D

4) Instruction processing consists of two steps:

- A) fetch and execute
- B) instruction and execute
- C) instruction and halt
- D) fetch and instruction

Answer: A

5) The _____ routine determines the nature of the interrupt and performs whatever actions are needed.

- A) interrupt handler
- B) instruction signal
- C) program handler
- D) interrupt signal

Answer: A

6) The unit of data exchanged between cache and main memory is _____ .

- A) block size
- B) map size
- C) cache size
- D) slot size

Answer: A

7) The _____ chooses which block to replace when a new block is to be loaded into the cache and the cache already has all slots filled with other blocks.

- A) memory controller
- B) mapping function
- C) write policy
- D) replacement algorithm

Answer: D

8) _____ is more efficient than interrupt-driven or programmed I/O for a multiple-word I/O transfer.

- A) Spatial locality
- B) Direct memory access
- C) Stack access
- D) Temporal locality

Answer: B

9) The _____ is a point-to-point link electrical interconnect specification that enables high-speed communications among connected processor chips.

- A) QPI B) DDR3 C) LRU D) ISR

Answer: A

10) Small, fast memory located between the processor and main memory is called:

- A) Block memory B) Cache memory
C) Direct memory D) WORM memory

Answer: B

11) In a uniprocessor system, multiprogramming increases processor efficiency by:

- A) Taking advantage of time wasted by long wait interrupt handling
B) Disabling all interrupts except those of highest priority
C) Eliminating all idle processor cycles
D) Increasing processor speed

Answer: A

12) The two basic types of processor registers are:

- A) User-visible and user-invisible registers
B) Control and user-invisible registers
C) Control and Status registers
D) User-visible and Control/Status registers

Answer: D

13) When an external device becomes ready to be serviced by the processor the device sends a(n) _____ signal to the processor.

- A) access B) halt C) handler D) interrupt

Answer: D

14) One mechanism Intel uses to make its caches more effective is _____, in which the hardware examines memory access patterns and attempts to fill the caches speculatively with data that is likely to be requested soon.

- A) mapping B) handling
C) interconnecting D) prefetching

Answer: D

15) A _____ organization has a number of potential advantages over a uniprocessor organization including performance, availability, incremental growth, and scaling.

- A) temporal locality
B) symmetric multiprocessor
C) direct memory access
D) processor status word

Answer: B

SHORT ANSWER QUESTIONS:

1) The invention of the _____ was the hardware revolution that brought about desktop and handheld computing.

Answer: microprocessor

2) To satisfy the requirements of handheld devices, the classic microprocessor is giving way to the _____, where not just the CPUs and caches are on the same chip, but also many of the other components of the system, such as DSPs, GPUs, I/O devices and main memory.

Answer: System on a Chip (SoC)

3) The processing required for a single instruction is called a(n) _____ cycle.

Answer: instruction

4) The fetched instruction is loaded into the _____.

Answer: Instruction Register (IR)

5) When an external device is ready to accept more data from the processor, the I/O module for that external device sends an _____ signal to the processor.

Answer: interrupt request

6) The _____ is a device for staging the movement of data between main memory and processor registers to improve performance and is not usually visible to the programmer or processor.

Answer: cache

7) External, nonvolatile memory is also referred to as _____ or auxiliary memory.

Answer: secondary memory

8) When a new block of data is read into the cache the _____ determines which cache location the block will occupy.

Answer: mapping function

9) In a _____ multiprocessor all processors can perform the same functions so the failure of a single processor does not halt the machine.

Answer: symmetric

10) A _____ computer combines two or more processors on a single piece of silicon.

Answer: multicore

11) A Control/Status register that contains the address of the next instruction to be fetched is called the _____.

Answer: Program Counter (PC)

12) Each location in Main Memory contains a _____ value that can be interpreted as either an instruction or data.

Answer: binary number

13) A special type of address register required by a system that implements user visible stack addressing is called a _____.

Answer: stack pointer

14) Registers that are used by system programs to minimize main memory references by optimizing register use are called _____.

Answer: user-visible registers

15) The concept of multiple programs taking turns in execution is known as _____.

Answer: multiprogramming