**Chapter 2: Performance Issues**

**TRUE OR FALSE**

**F** 1. Year by year the cost of computer systems continues to rise.

**T** 2. Processors are so inexpensive that we now have microprocessors we throw away.

**F** 3. Workstation systems cannot support highly sophisticated engineering and scientific applications.

**T** 4. The IAS is the prototype of all subsequent general-purpose

computers.

**T** 5. Cloud service providers use massive high-performance banks of servers to satisfy high-volume, high-transaction-rate applications for a broad spectrum of clients.

**T** 6. The raw speed of the microprocessor will not achieve its potential unless it is fed a constant stream of work to do in the form of computer instructions.

**F** 7. Superscalar execution is the same principle as seen in an assembly line.

**T** 8. Branch prediction potentially increases the amount of work available for the processor to execute.

**F** 9. Raw speed is far more important than how a processor performs when executing a given application.

**T** 10. The cache holds recently accessed data.

**MULTIPLE CHOICE**

1. Multiple parallel pipelines are used in **superscalar execution**.

A. speculative execution B. data flow analysis

**C. superscalar execution** D. branch prediction

1. The desktop application(s) that require the great power of today’s microprocessor-based systems include **all of the above**.

A. image processing B. speech recognition

C. videoconferencing **D. all of the above**

1. **Branch prediction** potentially increases the amount of work available for the processor to execute.

**A. Branch prediction** B. Performance balance

C. Pipelining D. BIPS

1. The interface between processor and **main memory** is the most crucial pathway in the entire computer because it is responsible for carrying a constant flow of program instructions and data between memory chips and the processor.

**A. main memory** B. pipeline

C. clock speed D. control unit

1. The **cache** is a relatively small fast memory interposed between a larger, slower memory and the logic that accesses the larger memory.

A. peripheral **B. cache**

C. processor D. arithmetic and logic unit

1. An increase in clock rate means that individual operations are executed **more rapidly**.

A. the same B. slower

C. with very little change **D. more rapidly**

1. A **GPU** is a core designed to perform parallel operations on graphics data.

A. MIC B. ALU

**C. GPU** D. PGD

1. A(n) **arithmetic** Mean is a good candidate for comparing the execution time performance of several systems.

A. Composite **B. Arithmetic**

C. Harmonic D. Evaluation

1. **Amdahl’s** law deals with the potential speedup of a program using multiple processors compared to a single processor.

A. Moore’s **B. Amdahl’s**

C. Little’s D. Murphy’s

1. One increment, or pulse, of a clock is referred to as a **clock cycle**.

**A. clock cycle** B. clock rate

C. clock speed D. cycle time

**SHORT ANSWER**

1. **Pipelining** enables a processor to work simultaneously on multiple instructions by performing a different phase for each of the multiple instructions at the same time.
2. **Superscalar execution** is the ability to issue more than one instruction in every processor clock cycle.
3. With **branch prediction** the processor looks ahead in the instruction code fetched from memory and predicts which branches, or groups of instructions, are likely to be processed next.
4. **Speculative execution** enables the processor to keep its execution engines as busy as possible by executing instructions that are likely to be needed.
5. Traditionally found on a plug-in graphics card, a **GPU** is used to encode and render 2D and 3D graphics as well as process video.
6. **Little’s** Law applies to a queuing system.
7. The three common formulas used for calculating a mean are arithmetic, harmonic, and **geometric**.
8. The **arithmetic** Mean used for a time-based variable, such as program execution time, has the important property that it is directly proportional to the total time.
9. The **harmonic** Mean is preferred when calculating rates.
10. The **geometric** Mean gives consistent results regardless of which system is used as a reference.