The _____ model is the basis for today's computers.

a. Leibnitz
b. von Neumann
c. Pascal
d. Charles Babbage
Correct Answer: (b)

In a computer, the _____ subsystem stores data and programs.

a. ALU
b. input/output
c. memory
d. control unit
Correct Answer (c)

In a computer, the _____ subsystem performs calculations and logical operations.

a. ALU
b. input/output
c. memory
d. control unit
Correct Answer (a)

In a computer, the _____ subsystem accepts data and programs and sends processing results to output devices.

a. ALU
b. input/output
c. memory
d. control unit
Correct Answer (b)

In a computer, the _____ subsystem serves as a manager of the other subsystems.

a. ALU
b. input/output
c. memory
d. control unit
Correct Answer (d)

According to the von Neumann model, _____ are stored in memory.

a. only data
b. only programs
c. data and programs
d. neither data nor programs

Correct Answer (c)

A step-by-step solution to a problem is called _____.

a. hardware
b. an operating system
c. a computer language
d. an algorithm
Correct Answer (d)

FORTRAN and COBOL are examples of _____.

a. hardware
b. operating systems
c. computer languages
d. algorithms
Correct Answer (c)

A 17th-century computing machine that could perform addition and subtraction was the _____.

a. Pascaline
b. Jacquard loom
c. Analytical Engine
d. Babbage machine
Correct Answer (a)

_____ is a set of instructions in a computer language that tells the computer what to do with data.

a. An operating system
b. An algorithm
c. A data processor
d. A program
Correct Answer (d)

_____ is the design and writing of a program in structured form.

a. Software engineering
b. Hardware engineering
c. Algorithm development
d. Instructional architecture
Correct Answer (a)

The first electronic special-purpose computer was called _____.

a. Pascal
b. Pascaline
c. ABC

d. ENIAC
Correct Answer (c)

One of the first computers based on the von Neumann model was called _____.

a. Pascal
b. Pascaline
c. ABC
d. EDVAC
Correct Answer (d)

The first computing machine to use the idea of storage and programming was called _____.

a. the Madeline
b. EDVAC
c. the Babbage machine
d. the Jacquard loom
Correct Answer (d)

_____ separated the programming task from computer operation tasks.

a. Algorithms
b. Data processors
c. High-level programming languages
d. Operating systems
Correct Answer (c)

The base of the decimal number system is ____.

a. 2
b. 8
c. 10
d. 16
Correct Answer: (c)

The base of the binary number system is ____.

a. 2
b. 8
c. 10
d. 16
Correct Answer: (a)

The base of the octal number system is ____.

a. 2
b. 8
c. 10

d. 16
Correct Answer: (b)

The base of the hexadecimal number system is ____.
a. 2
b. 8
c. 10
d. 16
Correct Answer: (d)

When converting a decimal integer to base b, we repeatedly _____ b.
a. divide
a. by
b. multiply
b. by
c. add to
d. subtract from
Correct Answer: (a)

When converting a decimal fraction to base b, we repeatedly ____b.
a. divide
a. by
b. multiply
b. by
c. add to
d. subtract from
Correct Answer: (b)

Which of the following representations is erroneous?
a. $(10111)_2$
b. $(349)_8$
c. $(3AB)_{16}$
d. 256
Correct Answer: (b)

Which of the following representations is erroneous?
a. $(10211)_2$
b. $(342)_8$
c. $(EEE)_{16}$
d. 145
Correct Answer: (a)

Which of the following representations is erroneous?

a. $(111)_2$
b. $(346)_8$
c. $(EEG)_{16}$
d. 221
Correct Answer: (c)

Which of the following representations is erroneous?

a. $(110)_2$
b. $(141)_8$
c. $(EF)_{16}$
d. 22A
Correct Answer: (d)

Which of the following is equivalent to 12 in decimal?

a. $(1110)_2$
b. $(C)_{16}$
c. $(15)_8$
d. None of the above
Correct Answer: (b)

Which of the following is equivalent to 24 in decimal?

a. $(11000)_2$
b. $(1A)_{16}$
c. $(31)_8$
d. None of the above
Correct Answer: (a)

A byte consists of _____ bits.

a. 2
b. 4
c. 8
d. 16
Correct Answer: (c)

In a set of 64 symbols, each symbol requires a bit pattern length of _____ bits.

a. 4
b. 5
c. 6
d. 7
Correct Answer: (c)

How many symbols can be represented by a bit pattern with ten bits?

a. 128
b. 256
c. 512
d. 1024
Correct Answer: (d)

If the ASCII code for E is 1000101, then the ASCII code for e is _____. Answer the question without consulting the ASCII table.

a. 1000110
b. 1000111
c. 0000110
d. 1100101
Correct Answer: (d)

A 32-bit code called _____ represents symbols in all languages.

a. ANSI
b. Unicode
c. EBCDIC
d. Extended ASCII
Correct Answer: (b)

An image can be represented in a computer using the _____ method.

a. bitmap graphic
a. only
b. vector graphic
b. only
c. Excess system
c. only
d. either bitmap or vector graphic
Correct Answer: (d)

In the _____ graphic method of representing an image in a computer, each pixel is assigned a bit patterns.

a. bitmap
b. vector
c. quantized
d. binary
Correct Answer: (a)

In the _____ graphic method of representing an image in a computer, the image is decomposed into a combination of geometrical figures.

a. bitmap
b. vector
c. quantized
d. binary
Correct Answer: (b)

In the _____ graphic method of representing an image in a computer, re-scaling of the image creates a ragged or grainy image.

a. bitmap
b. vector
c. quantized
d. binary
Correct Answer: (a)

When we want to store music in a computer, the audio signal must be _____.

a. sampled
a. only
b. quantized only
c. coded
c. only
d. sampled, quantized, and coded
Correct Answer: (d)

A floating-point value after normalization is $(1.0101) \times 2^{-4}$.
What is the value of exponent section in the Excess-127 representation?

a. 4
b. -4
c. 127
d. 123
Correct Answer: (d)

Assume a new Excess system uses 17 bits to represent the exponent section. What is he bias value in this system?

a. 17
b. 16
c. 65535
d. 65536
Correct Answer: (c)

Which number representation method is often used to store the exponential value of a fractional part?

a. unsigned integers

b. two’s complement
c. Excess
d. ten’s complement
Correct Answer: (c)

In an Excess conversion, we _____ the number to be converted.
a. add the bias number to
b. subtract
b. the bias number from
c. multiply the bias number by
d. divide
d. the bias number by
Correct Answer: (a)

When a fractional part is normalized, the computer stores the _____.
a. only the sign
b. only the exponent
c. only the mantissa
d. the sign, exponent, and mantissa
Correct Answer: (d)

The precision of the fractional part of a number stored in a computer is defined by the _____.
a. sign
b. exponent
c. mantissa
d. last digit
Correct Answer: (c)

The combination of sign and mantissa of a real number in IEEE standard floating point format is stored as an integer in the _____ representation.
a. unsigned
b. sign-and-magnitude
c. two’s complement
d. one’s complement
Correct Answer: (b)

_____ is an arithmetic operation.
a. The exclusive OR
b. The unary NOT
c. Subtraction
d. The binary AND
Correct Answer: (c)

_____ is a logical bit operator.

a. The exclusive OR
b. The unary NOT
c. The binary AND
d. exclusive OR, unary NOT, or binary AND
Correct Answer: (d)

The _____ method of integer representation is the most common method for storing integers in computer memory.

a. sign-and-magnitude
b. one's complement
c. two's complement
d. unsigned integers
Correct Answer: (c)

In two's complement addition, if there is a final carry after the left most column addition, _____.

a. add it to the right most column
b. add it to the left most column
c. discard it
d. increase the bit length
Correct Answer: (c)

For an 8-bit allocation, the smallest decimal number that can be represented in two's complement form is _____.

a. -8
b. -127
c. -128
d. -256
Correct Answer: (c)

For an 8-bit allocation, the largest decimal number that can be represented in two's complement form is _____.

a. 8
b. 127
c. 128
d. 256
Correct Answer: (b)

In two's complement representation with a 4-bit allocation, we get _____ when we add 1 to 7.

a. 8
b. 1

c. -7
d. -8
Correct Answer: (d)

In two's complement representation with a 4-bit allocation, we get _____ when we add 5 to 5.
a. -5
b. -6
c. -7
d. 10
Correct Answer: (b)

If the exponent in Excess_127 is binary 10000101, the exponent in decimal is _____.
a. 6
b. 7
c. 8
d. 9
Correct Answer: (a)

If we are adding two numbers, one of which has an exponent value of 7 and the other an exponent value of 9, we need to shift the decimal point of the smaller number _____.
a. one place to the left
b. one place to the right
c. two places to the left
d. two places to the right
Correct Answer: (c)

_____ operator (s) takes two inputs to produce one output.
a. Only AND
b. Only OR
c. Only XOR
d. AND, OR, or XOR
Correct Answer: (d)

The unary _____ operator inverts its single input.
a. AND
b. OR
c. NOT
d. XOR
Correct Answer: (c)

_____ operator (s), if the input is two 0s, the output is 0.
a. In only AND

b. In only OR
c. In only XOR
d. In AND, OR, or XOR
Correct Answer: (d)

_____ operator (s), if the input is two 1s, the output is 0.
a. In only AND
b. In only OR
c. In only XOR
d. In AND, OR, or XOR
Correct Answer: (c)

For the binary AND operation, only an input of _____ gives an output of 1.
a. two 0s
b. two 1s
c. one 0 and one 1
d. two 2s
Correct Answer: (b)

For the binary OR operation, only an input of _____ gives an output of 0.
a. two 0s
b. two 1s
c. one 0 and one 1
d. two 2s
Correct Answer: (a)

We use a bit pattern called a _____ to modify another bit pattern.
a. mask
b. carry
c. float
d. byte
Correct Answer: (a)

To flip all the bits of a bit pattern, make a mask of all 1s and then _____ the bit pattern and the mask.
a. AND
b. OR
c. XOR
d. NOT
Correct Answer: (c)

To un-set (force to 0) all the bits of a bit pattern, make a mask of all 0s and then _____ the bit pattern and the mask.

a. AND
b. OR
c. XOR
d. NOT
Correct Answer: (a)

To set (force to 1) all the bits of a bit pattern, make a mask of all 1s and then _____ the bit pattern and the mask.

a. AND
b. OR
c. XOR
d. NOT
Correct Answer: (b)

The _____ is a computer subsystem that performs operations on data.

a. CPU
b. memory
c. I/O hardware
d. bus subsystem
Correct Answer: (a)

_____ is a stand-alone storage location that holds data temporarily.

a. An ALU
b. A register
c. A control unit
d. A tape drive
Correct Answer: (b)

_____ is a unit that can add two inputs.

a. An ALU
b. A register
c. A control unit
d. A tape drive
Correct Answer: (a)

A register in a CPU can hold _____.

a. only data
b. only instructions
c. only program counter values
d. data, instruction, or program counter values

Correct Answer: (d)

A control unit with five wires can define up to _____ operations.

a. 5
b. 10
c. 16
d. 32
Correct Answer: (d)

A word can be _____ bits.

a. only 8
b. only 16
c. only 32
d. 8, or 16, or 32
Correct Answer: (d)

If the memory address space is 16 MB and the word size is 8 bits, then _____ bits are needed to access each word.

a. 8
b. 16
c. 24
d. 32
Correct Answer: (c)

The data in _____ is erased if the computer is powered down.

a. RAM
b. ROM
c. a tape drive
d. a CD-ROM
Correct Answer: (a)

_____ is a memory type with capacitors that need to be refreshed periodically.

a. SRAM
b. DRAM
c. ROM
d. CROM
Correct Answer: (b)

_____ is a memory type with traditional flip-flop gates to hold data.

a. SRAM
b. DRAM
c. ROM

d. CROM
Correct Answer: (a)

There are _____ bytes in 16 Terabytes.

a. 2^{16}
b. 2^{40}
c. 2^{44}
d. 2^{56}
Correct Answer: (a)

_____ can be programmed and erased using electronic impulses but can remain in a computer during erasure.

a. ROM
b. PROM
c. EPROM
d. EEPROM
Correct Answer: (d)

_____ is a type of memory in which the user, not the manufacturer, stores programs that cannot be overwritten.

a. ROM
b. PROM
c. EPROM
d. EEPROM
Correct Answer: (b)

Main memory in a computer usually consists of large amounts of _____ speed memory.

a. high
b. medium
c. low
d. very high speed
Correct Answer: (c)

A _____ is a storage device to which the user can write information only once.

a. CD-ROM
b. CD-R
c. CD-RW
d. CD-RR
Correct Answer: (b)

A _____ is a storage device that can undergo multiple writes and erasures.

a. CD-ROM

b. CD-R
c. CD-RW
d. CD-RR
Correct Answer: (c)

The smallest storage area on a magnetic disk that can be accessed at one time is a _____.
a. track
b. sector
c. frame
d. head
Correct Answer: (b)

If the memory has 2^{32} words, the address bus needs to have _____ wires.
a. 8
b. 16
c. 32
d. 64
Correct Answer: (c)

A control bus with eight wires can define _____ operations.
a. 8
b. 16
c. 256
d. 512
Correct Answer: (c)

A _____ controller is a high-speed serial interface that transfers data in packets.
a. SCSI
b. USB
c. FireWire
d. USB and FireWire
Correct Answer: (d)

The three steps in the running of a program on a computer are performed in the specific order _____.
a. fetch, execute, and decode
b. decode, execute, and fetch
c. fetch, decode, and execute
d. decode, fetch, and execute
Correct Answer: (c)

In the _____ method for synchronizing the operation of the CPU with an I/O device, the I/O device informs the CPU when it is ready for data transfer.

a. programmed I/O
b. interrupt-driven I/O
c. DMA
d. isolated I/O
Correct Answer: (b)

In the _____ method for synchronizing the operation of the CPU with an I/O device, the CPU is idle until the I/O operation is finished.

a. programmed I/O
b. interrupt-driven I/O
c. DMA
d. isolated I/O
Correct Answer: (a)

In the _____ method for synchronizing the operation of the CPU with an I/O device, a large block of data can be passed from an I/O device to memory directly.

a. programmed I/O
b. interrupt-driven I/O
c. DMA
d. isolated I/O
Correct Answer: (c)

The TCP/IP model has _____ layers.

a. five
b. six
c. seven
d. eight
Correct Answer: (a)

The _____ layer of the TCP/IP protocol suite provides services for end users.

a. data-link
b. transport
c. application
d. physical
Correct Answer: (c)

The _____ layer of the TCP/IP protocol suite transmits a bit stream over a physical medium.

a. physical
b. data-link
c. network

d. transport
Correct Answer: (a)

The _____ layer of the TCP/IP protocol suite is responsible for node-to-node delivery of a frame between two adjacent nodes.

a. transport
b. network
c. data-link
d. session
Correct Answer: (c)

The _____ layer of the TCP/IP protocol suite is responsible for source-to-destination delivery of the entire message.

a. transport
b. network
c. data-link
d. session
Correct Answer: (b)

What is the domain name in the e-mail address *kayla@nasa.gov*?

a. kayla
b. kayla@nasa.gov
c. nasa.gov
d. gov
Correct Answer: (c)

Which physical topology uses a hub or switch?

a. bus
b. ring
c. star
d. bus and ring
Correct Answer: (c)

IP addresses are currently _____ bits in length.

a. 4
b. 8
c. 32
d. 40
Correct Answer: (c)

_____ protocol (s) is one of the protocols in the transport layer.

a. Only TCP
b. Only UDP
c. Only SCTP
d. TCP, UDP, and SCTP
Correct Answer: (d)

_____ is a protocol for file transfer.
a. FTP
b. SMTP
c. TELNET
d. HTTP
Correct Answer: (a)

_____ is a protocol for e-mail services.
a. FTP
b. SMTP
c. TELNET
d. HTTP
Correct Answer: (b)

_____ is a protocol for accessing and transferring documents on the WWW.
a. FTP
b. SMTP
c. TELNET
d. HTTP
Correct Answer: (d)

_____ is a program that facilitates the execution of other programs.
a. An operating system
b. Hardware
c. A queue
d. An application program
Correct Answer: (a)

_____ supervises the activity of each component in a computer system.
a. An operating system
b. Hardware
c. A queue
d. An application program
Correct Answer: (a)

Multi-programming requires a _____ operating-system.

a. batch
b. time-sharing
c. parallel
d. distributed
Correct Answer: (b)

_____ is multi-programming with swapping.
a. Partitioning
b. Paging
c. Demand paging
d. Queuing
Correct Answer: (c)

_____ is multi-programming without swapping.
a. Partitioning
b. Virtual memory
c. Demand paging
d. Queuing
Correct Answer: (a)

In _____, only one program can reside in memory for execution.
a. mono-programming
b. multi-programming
c. partitioning
d. paging
Correct Answer: (a)

_____ is a multi-programming method in which multiple programs are entirely in memory with each program occupying a contiguous space.
a. Partitioning
b. Paging
c. Demand paging
d. Demand segmentation
Correct Answer: (a)

In paging, a program is divided into equally sized sections called _____.
a. pages
b. frames
c. segments
d. partitions
Correct Answer: (a)

In _____, the program can be divided into differently sized sections.

a. partitioning
b. paging
c. demand paging
d. demand segmentation
Correct Answer: (d)

In _____, the program can be divided into equally sized sections called pages, but the pages need not be in memory at the same time for execution.

a. partitioning
b. paging
c. demand paging
d. demand segmentation
Correct Answer: (c)

A process in the _____ state can go to either the ready, terminated, or waiting states.

a. hold
b. virtual
c. running
d. hold or running
Correct Answer: (c)

A process in the ready state goes to the running state when _____.

a. it enters memory
b. it requests I/O
c. it gets access to the CPU
d. it finishes running
Correct Answer: (c)

A program becomes a _____ when it is selected by the operating system and brought to the hold state.

a. job
b. process
c. deadlock
d. partition
Correct Answer: (a)

Every process is _____.

a. only a job
b. only a program
c. only a partition
d. a job and a program

Correct Answer: (d)

The _____ scheduler creates a process from a job and changes a process back to a job.

a. job
b. process
c. virtual
d. queue

Correct Answer: (a)

The _____ scheduler moves a process from one process state to another.

a. job
b. process
c. virtual
d. queue

Correct Answer: (b)

To prevent _____, an operating system can put resource restrictions on processes.

a. starvation
b. synchronization
c. paging
d. deadlock

Correct Answer: (d)

_____ can occur if a process has too many resource restrictions.

a. Starvation
b. Synchronization
c. Paging
d. Deadlock

Correct Answer: (a)

The _____ manager is responsible for archiving and backup.

a. memory
b. process
c. device
d. file

Correct Answer: (d)

The _____ manager is responsible for access to I/O devices.

a. memory
b. process
c. device
d. file

Correct Answer: (c)

_____ is a step-by-step method for solving a problem or doing a task.

a. A construct
b. A recursion
c. An iteration
d. An algorithm
Correct Answer: (d)

There are _____ basic constructs in computer -science.

a. one
b. two
c. three
d. four
Correct Answer: (c)

The _____construct tests a condition.

a. sequence
b. decision
c. repetition
d. flow
Correct Answer: (b)

The _____ construct uses a set of actions one after another.

a. sequence
b. decision
c. repetition
d. flow
Correct Answer: (a)

The _____ construct handles repeated actions.

a. sequence
b. decision
c. repetition
d. flow
Correct Answer: (c)

_____ is a pictorial representation of an algorithm.

a. A UML diagram
b. A program
c. Pseudocode
d. An algorithm

Correct Answer: (a)

_____ is an English-language-like representation of code.

a. A UML diagram
b. A program
c. Pseudocode
d. An algorithm

Correct Answer: (c)

_____ is a basic algorithm that adds a list of numbers.

a. Summation
b. Product
c. Smallest
d. Largest

Correct Answer: (a)

_____ is a basic algorithm that multiplies a list of numbers.

a. Summation
b. Product
c. Smallest
d. Largest

Correct Answer: (b)

_____ is a basic algorithm that arranges data according to its value.

a. Inquiry
b. Sorting
c. Searching
d. Recursion

Correct Answer: (b)

The items are divided into two lists (sorted and unsorted) _____ sort.

a. only in a selection
b. only in a bubble
c. only in an insertion
d. in selection, bubble, or insertion

Correct Answer: (d)

In _____ sort, the item that goes into the sorted list is always the first item in the unsorted list.

a. selection
b. bubble
c. insertion
d. every

Correct Answer: (c)

In _____ sort, the smallest item from the unsorted list is swapped with the item at the beginning of the unsorted list.

a. selection
b. bubble
c. insertion
d. every
Correct Answer: (a)

In _____ sort, the smallest item moves to the beginning of the unsorted list. There is no one-to-one swapping.

a. selection
b. bubble
c. insertion
d. every
Correct Answer: (b)

_____ is a basic algorithm in which we want to find the location of a target in a list of items.

a. Sorting
b. Searching
c. Product
d. Summation
Correct Answer: (b)

We use a _____ search for an unordered list.

a. sequential
b. binary
c. bubble
d. insertion
Correct Answer: (a)

We use a _____ search for an ordered list.

a. sequential
b. binary
c. bubble
d. insertion
Correct Answer: (b)

_____ is a process in which an algorithm calls itself.

a. Insertion
b. Searching

c. Recursion
d. Iteration
Correct Answer: (c)

The only language understood by computer hardware is a _____ language.
a. machine
b. symbolic
c. high-level
d. natural
Correct Answer: (a)

C, C++, and Java can be classified as _____ languages.
a. machine
b. symbolic
c. high-level
d. natural
Correct Answer: (c)

FORTRAN is a(n) _____ language.
a. procedural
b. functional
c. declarative
d. object-oriented
Correct Answer: (a)

Pascal is a(n) _____ language.
a. procedural
b. functional
c. declarative
d. object-oriented
Correct Answer: (a)

Java is a(n) _____ language.
a. procedural
b. functional
c. declarative
d. object-oriented
Correct Answer: (d)

LISP is a(n) _____ language.
a. procedural
b. functional

c. declarative
d. object-oriented
Correct Answer: (b)

_____ is a common language in the business -environment.
a. FORTRAN
b. C++
c. C
d. COBOL
Correct Answer: (d)

_____ is a popular object-oriented language.
a. FORTRAN
b. COBOL
c. Java
d. LISP
Correct Answer: (c)

A _____ program can be either an application or an applet.
a. FORTRAN
b. C++
c. C
d. Java
Correct Answer: (d)

LISP and Scheme are both _____ languages.
a. procedural
b. functional
c. declarative
d. object-oriented
Correct Answer: (b)

Prolog is an example of a(n) _____ language.
a. procedural
b. functional
c. declarative
d. object-oriented
Correct Answer: (c)

One phase in system development is _____.
a. analysis
b. application

c. designing
d. collecting
Correct Answer: (a)

Defining the users, requirements, and methods is part of the _____ phase.
a. analysis
b. design
c. implementation
d. testing
Correct Answer: (a)

In the system development process, writing the program is part of the _____ phase.
a. analysis
b. design
c. implementation
d. testing
Correct Answer: (c)

In the system development process, structure charts are tools used in the _____ phase.
a. analysis
b. design
c. implementation
d. testing
Correct Answer: (b)

Testing a software system can involve _____ testing.
a. black-box
b. glass-box
c. neither black-box nor glass-box
d. both black-box and glass-box
Correct Answer: (d)

_____ is the breaking up of a large project into smaller parts.
a. Coupling
b. Incrementing
c. Obsolescence
d. Modularization
Correct Answer: (d)

_____ is a measure of how tightly two modules are bound to each other.
a. Modularity
b. Coupling

c. Interoperability
d. Cohesion
Correct Answer: (b)

_____between modules in a software system must be minimized.
a. Coupling
b. Cohesion
c. Neither coupling nor cohesion
d. Both coupling and cohesion
Correct Answer: (a)

_____between modules in a software system must be maximized.
a. Coupling
b. Cohesion
c. Neither coupling nor cohesion
d. Both coupling and cohesion
Correct Answer: (b)

A data structure can be _____.
a. only an array
b. only a record
c. only a linked list
d. an array, a record, or a linked list
Correct Answer: (d)

An array that consists of just rows and columns is a _____ array.
a. one-dimensional
b. two-dimensional
c. three-dimensional
d. multidimensional
Correct Answer: (b)

Each element in a record is called _____.
a. a variable
b. an index
c. a field
d. a node
Correct Answer: (c)

All the members of a record must be _____.
a. the same type
b. related types

c. integer type
d. character type
Correct Answer: (b)

_____ is an ordered collection of data in which each element contains the location of the next element.
a. An array
b. A record
c. A linked list
d. A file
Correct Answer: (c)

In a linked list, each element contains _____.
a. only data
b. only a link
c. neither data nor a link
d. data and a link
Correct Answer: (d)

The _____ is a pointer that identifies the next element in the linked list.
a. link
b. node
c. array
d. data
Correct Answer: (a)

Given a linked list called *children,* the pointer variable *children* identifies _____ element of the linked list.
a. the first
b. the second
c. the last
d. any
Correct Answer: (a)

An empty linked list consists of _____.
a. a node
b. two nodes
c. data and a link
d. a null head pointer
Correct Answer: (d)

To traverse a list, you need a _____ pointer.

a. null
b. walking
c. beginning
d. insertion
Correct Answer: (b)

In an abstract data type, _____.
a. the ADT implementation is known
b. the ADT implementation is hidden
c. the ADT public operations are hidden
d. Nothing is hidden
Correct Answer: (b)

A stack is a _____ structure.
a. FIFO
b. LIFO
c. DIFO
d. SIFO
Correct Answer: (b)

A(n) _____ list is also known as a queue.
a. LIFO
b. FIFO
c. unordered
d. ordered
Correct Answer: (b)

If A is the first data element input into a stack, followed by B, C, and D, then _____ is the first element to be removed.
a. A
b. B
c. C
d. D
Correct Answer: (d)

If A is the first data element input into a queue, followed by B, C, and D, then _____ is the first element to be removed.
a. A
b. B
c. C
d. D
Correct Answer: (a)

The pop operation _____ of the stack.

a. deletes an item from the top
b. deletes an item from the bottom
c. inserts an item at the top
d. inserts an item at the bottom
Correct Answer: (a)

The push operation _____ of the stack.

a. deletes an item from the top
b. deletes an item from the bottom
c. inserts an item at the top
d. inserts an item at the bottom
Correct Answer: (c)

In a binary tree, each node has _____ two subtrees.

a. more than
b. less than
c. at most
d. at least
Correct Answer: (c)

In preorder traversal of a binary tree, the _____.

a. left subtree
a. is processed first
b. right subtree is processed first
c. root is processed first
d.
d. the root is never processed
Correct Answer: (c)

In _____ traversal of a binary tree, the right subtree is processed last.

a. preorder
b. inorder
c. postorder
d. any order
Correct Answer: (b)

In postorder traversal of a binary tree, the root is processed _____.

a. first
b. second

c. last
d. after the left subtree
Correct Answer: (c)

In postorder traversal of a binary tree, the left subtree is processed _____.
a. first
b. second
c. last
d. after the right subtree
Correct Answer: (a)

In _____ traversal of a binary tree, the left subtree is processed last.
a. preorder
b. inorder
c. postorder
d. out of order
Correct Answer: (a)

In an inorder traversal of a binary tree, the root is processed _____.
a. first
b. second
c. last
d. two times
Correct Answer: (b)

_____ file can be accessed randomly.
a. A sequential
b. An indexed
c. A hashed
d. Any
Correct Answer: (d)

_____ file can be accessed sequentially.
a. A sequential
b. An indexed
c. A hashed
d. No
Correct Answer: (a)

When a sequential file is updated, the _____ file gets the actual update.
a. new master
b. old master

c. transaction
d. error report
Correct Answer: (a)

When a sequential file is updated, the _____ file contains a list of all errors occurring during the update process.

a. new master
b. old master
c. transaction
d. error report
Correct Answer: (d)

When a sequential file is updated, the _____ file contains the changes to be applied.

a. new master
b. old master
c. transaction
d. error report
Correct Answer: (c)

After a sequential file is updated, the _____ file contains the most current data.

a. new master
b. old master
c. transaction
d. error report
Correct Answer: (a)

If the transaction file key is 20 and the first master file key is 25, then we _____.

a. add the new record to the new master file
b. revise the contents of the old master file
c. delete the data
d. write the old master file record to the new master file
Correct Answer: (a)

If the transaction file key is 20 with a delete code and the master file key is 20, then we _____.

a. add the transaction to the new master file
b. revise the contents of the old master file
c. delete the data
d. write the old master file record to the new master file
Correct Answer: (c)

An indexed file consists of _____.

a. only a sequential data file

b. only an index
c. only a random data file
d. an index
d. and random data file
Correct Answer: (d)

The index of an indexed file has _____ fields.
a. two
b. three
c. four
d. any number of
Correct Answer: (a)

In the _____ hashing method, selected digits are extracted from the key and used as the address.
a. direct
b. division remainder
c. modulo division
d. digit extraction
Correct Answer: (d)

In the _____ hashing method, the key is divided by the file size, and the address is the remainder plus 1.
a. direct
b. modulo division
c. division remainder
d. digit extraction
Correct Answer: (b)

In the _____ hashing method, there are no synonyms or collisions.
a. direct
b. modulo division
c. division remainder
d. digit extraction
Correct Answer: (a)

_____ are keys that hash to the same location in the data file.
a. Collisions
b. Buckets
c. Synonyms
d. Linked lists
Correct Answer: (c)

When a hashing algorithm produces an address for an insertion key and that address is already occupied, it is called a _____.

a. collision
b. probe
c. synonym
d. linked list
Correct Answer: (a)

The address produced by a hashing algorithm is the _____ address.

a. probe
b. synonym
c. collision
d. home
Correct Answer: (d)

The _____ area is the file area that contains all the home addresses.

a. probe
b. linked
c. hash
d. prime
Correct Answer: (d)

In the _____ collision resolution method, we try to put data that cannot be placed in location 123 into location 124.

a. open addressing
b. linked list
c. bucket hashing
d. random hashing
Correct Answer: (a)

In a three-level DBMS architecture, the layer that interacts directly with the hardware is the _____ level.

a. external
b. conceptual
c. internal
d. physical
Correct Answer: (c)

In a three-level DBMS architecture, the _____ level determines where data is actually stored on the storage devices.

a. external
b. conceptual

c. internal
d. physical
Correct Answer: (c)

The _____ level of a three-level DBMS architecture defines the logical view of the data.
a. external
b. conceptual
c. internal
d. physical
Correct Answer: (b)

The data model and the schema of a DBMS are often defined at the _____ level.
a. external
b. conceptual
c. internal
d. physical
Correct Answer: (b)

In a three-level DBMS architecture, the _____ level interacts directly with the users.
a. external
b. conceptual
c. internal
d. physical
Correct Answer: (a)

Of the various database models, the _____ model is the most prevalent today.
a. hierarchical
b. network
c. relational
d. linked list
Correct Answer: (c)

Each column in a relation is called _____.
a. an attribute
b. a tuple
c. a union
d. an attitude
Correct Answer: (a)

Each row in a relation is called _____.
a. an attribute
b. a tuple

c. a union
d. an attitude
Correct Answer: (b)

A unary operator is applied to _____ relation(s) and creates an output of _____ relation(s).
a. one, one
b. one, two
c. two, one
d. two, two
Correct Answer: (a)

A binary operator is applied to _____ relations (s) and creates an output of _____ relation(s).
a. one, one
b. one, two
c. two, one
d. two, two
Correct Answer: (c)

The unary _____ operation always results in a relation that has exactly one more row than the original relation.
a. insert
b. delete
c. update
d. select
Correct Answer: (a)

If you want to change the value of an attribute of a tuple, you use the _____ operation.
a. project
b. join
c. update
d. select
Correct Answer: (c)

The operation that takes two relations and combines them based on common attributes is the _____ operation.
a. join
b. project
c. union
d. intersection
Correct Answer: (a)

If you need to delete an attribute in a relation, you can use the _____ operation.

a. join
b. project
c. union
d. intersection
Correct Answer: (b)

You want to create a relation called New that contains tuples that belong to both relation A and relation B. For this, you can use the _____ operation.

a. select
b. union
c. project
d. intersection
Correct Answer: (d)

Which of the following is a unary operator?

a. intersection
b. union
c. join
d. project
Correct Answer: (d)

Which of the following is a binary operator?

a. select
b. update
c. difference
d. all of the above
Correct Answer: (c)

_____ is a declarative language used on relational databases.

a. PDQ
b. SQL
c. LES
d. PBJ
Correct Answer: (b)

Three security goals are _____.

a. confidentiality, cryptography, and nonrepudiation
b. confidentiality, encryption, and decryption
c. confidentiality, integrity, and availability
d. confidentiality, denial of service, and masquerading
Correct Answer: (c)

Which of the following attacks is threatening integrity?

a. Masquerading
b. Traffic Analysis
c. Denial of service
d. Encoding
Correct Answer: (a)

Which of the following attacks is threatening availability?

a. Replaying
b. Modification
c. Denial of service
d. Decoding
Correct Answer: (c)

_____ means concealing the contents of a message by enciphering.

a. Steganography
b. Cryptography
c. Compressing
d. Authentication
Correct Answer: (b)

_____means concealing the message by covering it with something else.

a. Cryptography
b. Steganography
c. Compressing
d. Authentication
Correct Answer: (b)

In _____cryptography, the same key is used by the sender and the receiver.

a. symmetric-key
b. asymmetric-key
c. public-key
d. open-key
Correct Answer: (a)

In _____ cryptography, the same key is used in both directions.

a. symmetric-key
b. asymmetric-key
c. public-key
d. open-key
Correct Answer: (a)

_____ cryptography is often used for long messages.

a. Symmetric-key
b. Asymmetric-key
c. Public-key
d. Open-key
Correct Answer: (a)

_____ cryptography is often used for short messages.

a. Symmetric-key
b. Asymmetric-key
c. Secret-key
d. Open-key
Correct Answer: (b)

_____means that the sender and the receiver expect confidentiality.

a. Nonrepudiation
b. Integrity
c. Authentication
d. encryption and decryption
Correct Answer: (d)

_____ means that the data must arrive at the receiver exactly as they were sent.

a. Nonrepudiation
b. Message integrity
c. Authentication
d. Secrecy
Correct Answer: (b)

_____ can provide authentication, integrity, and nonrepudiation for a message.

a. Encryption/decryption
b. Digital signature
c. Compression
d. Key-exchange
Correct Answer: (b)

In _____, the identity of a party is verified once for the entire duration of system access.

a. entity authentication
b. message integrity
c. message authentication
d. message encryption

Correct Answer: (a)

In _____ cryptography, everyone has access to everyone's public key.

a. symmetric-key
b. asymmetric-key
c. secret-key
d. private-key
Correct Answer: (b)

In the asymmetric-key method used for confidentiality, which key(s) is (are) publicly known?

a. encryption key only
b. decryption key only
c. both encryption and decryption keys
d. neither encryption key nor decryption key
Correct Answer: (b)

The RSA algorithm for confidentiality uses _____ cryptography.

a. asymmetric-key
b. symmetric-key
c. substitution
d. transposition
Correct Answer: (a)

In RSA, if user A wants to send an encrypted message to user B, the plaintext is encrypted with the public key of _____.

a. user A
b. user B
c. the network
d. a third party.
Correct Answer: (b)