**JUNIOR SOFTWARE DEVELOPER**

**TECHNICAL PAPER I**

1. What is the minimum number of NAND gates required to implement a 2-input EXCLUSIVE-OR function without using any other logic gate?
   1. 3
   2. 4
   3. 5
   4. 6

Ans: b

1. Which logic gate is used to detect overflow in 2’s complement arithmetic?
   1. OR
   2. AND
   3. XOR
   4. NAND

Ans: c

1. Consider the following functions: F1=X’Y’Z+X’YZ+XY’ and F2=XY’+X’Z

Which of the following is true?

* 1. F1, F2 are same
  2. F1, F2 are different
  3. Can not determine
  4. None of these

Ans: a

1. The Boolean expression AB+AB’+A’C+AC is independent of
   1. A
   2. B
   3. C
   4. None of these

Ans: b

1. The minimal expression of F(ABCD)=∑(0, 5, 7, 8, 9, 10, 11, 14, 15) is
   1. B’+C’+D’
   2. AC+AB’+B’C’D’+A’BD
   3. B’C’D’+AB’+A’BD+AC+BCD
   4. None of these

Ans: b

1. In a ripple counter using edge-triggered JK flip flops, the pulse input is applied to
   1. Clock input of all flip flops
   2. J and K input of one flip flop
   3. J and K input of all flip flops
   4. Clock input of one flip flops

Ans: b

1. In a positive edge triggered JK flip flop, J=K=0 produces
   1. No change
   2. Low state
   3. High State
   4. Toggle state

Ans: a

1. The Boolean expression (A+C)(AB’+AC)(AC’+B’) can be simplified as
   1. A’B+BC
   2. AB+BC
   3. AB+A’C
   4. AB’

Ans: d

1. In order to build a MOD-18 counter, the minimum number of flip flops required is
   1. 9
   2. 6
   3. 4
   4. 5

Ans: d

1. How many address lines and data lines are required to provide a memory capacity 16Kx16
   1. 10, 4
   2. 16, 16
   3. 14, 16
   4. 4, 16

Ans: c

1. How many 3 to 8 line decoders with an enable input are needed to construct a 6 to 64 decoder without logic gates?
   1. 8
   2. 2
   3. 4
   4. 9

Ans: d

1. Which of the following circuits can be used as parallel to serial converter?
   1. Demultiplexer
   2. Decoder
   3. Multiplexer
   4. Encoder

Ans: c

1. What is the minimum size of the multiplexer required if only one multiplexer and one inverter are allowed to be used to implement any n variable Boolean function?
   1. line to 1 line
   2. line to 1 line
   3. line to 1 line
   4. line to 1 line

Ans: c

1. What is the minimum size of ROM required to store the complete truth table of an 8-bitx8-bit multiplier?
   1. 64Kx16 bits
   2. 32Kx16 bits
   3. 16Kx8 bits
   4. 64Kx32 bits

Ans: a

1. In comparison with SRAM, the DRAM has
   1. Lower bit density and higher power consumption
   2. Higher bit density and higher power consumption
   3. Lower bit density and lower power consumption
   4. Higher bit density and higher power consumption

Ans: b

1. What is the number of chips required to provide a memory capacity of 4096 bytes, if chip size is 128x8?
   1. 64
   2. 32
   3. 8
   4. 12

Ans: b

1. The most relevant addressing mode to write position independent code is
   1. Direct mode
   2. Indirect mode
   3. Relative mode
   4. Indexed mode

Ans: c

1. The programming that actually controls the path of signals or data within the computer is called
   1. Micro programming
   2. System programming
   3. Assembly programming
   4. Machine language programming

Ans: a

1. The address of the location of the operand is given explicitly as a part of instruction in
   1. Absolute mode
   2. Immediate mode
   3. Indirect mode
   4. Index mode

Ans: a

1. The principle of the locality of reference justifies the use of
   1. Swap memory
   2. Virtual memory
   3. RAM
   4. Cache memory

Ans: d

1. In the Big Endian system the computer stores
   1. MSB of data in the lowest memory address of data unit
   2. LSB of data in the lowest memory address of data unit
   3. MSB of data in the highest memory address of data unit
   4. LSB of data in the highest memory address of data unit

Ans: a

1. The processing speeds of pipeline segments are usually
   1. Equal
   2. Unequal
   3. Greater
   4. None of these

Ans: b

1. The register or main memory location which contains the effective address of the operand is known as
   1. Indexed register
   2. Special locations
   3. Pointer
   4. None of these

Ans: c

1. The branch logic that provides making capabilities in the control unit is known as
   1. Conditional transfer
   2. Unconditional transfer
   3. Controlled transfer
   4. Uncontrolled transfer

Ans: a

1. Which of the following operation is not performed by CPU?
   1. Logic operation
   2. Data transfer
   3. Arithmetic operation
   4. None of these

Ans: b

1. In which addressing mode the effective address of the operand is generated by adding a constant value to the content of register?
   1. Index
   2. Absolute
   3. Indirect
   4. Immediate

Ans: a

1. A sequence of two instructions that multiplies the contents of the DE register pair by 2 and store the result in the HL register pair in 8085 microprocessor is
   1. XTHL and DAD H
   2. XCHG and DAD B
   3. PCHL and DAD D
   4. XCHG and DAD H

Ans: a

1. The TRAP is one of the interrupts available in 8085. Which one of the following statement is true of TRAP?
   1. It is positive edge triggered
   2. It is negative edge triggered
   3. It is both positive and negative edge triggered
   4. None of these

Ans: c

1. In a distributed computing environment Distributed Shared Memory is used which is
   1. Logical combination of physical memories on the nodes
   2. Logical combination of the virtual memories on the nodes
   3. Logical combination of HDD of all nodes
   4. Both a and b

Ans: a

1. Which of the following DMA transfer modes and interrupt handling mechanism will enable the highest input-output band width?
   1. Block transfer, Polling interrupt
   2. Block transfer, Vector interrupt
   3. Cycle stealing, Vector interrupt
   4. Both b and c

Ans: b

1. Consider a set of m tasks with known runtimes r1, r2…rm to be run in a uniprocessor system. Which of the following scheduling algorithms will result maximum throughput?
   1. Shortest job first
   2. Round Robin
   3. First come first serve
   4. Highest response ration next

Ans: a

1. Round Robin scheduling is the preemptive version of
   1. First come first serve
   2. Shortest job first
   3. Shortest remaining time
   4. Longest remaining time

Ans: a

1. Consider a system having m resources of same type. The resources are shared by 3 processes P1, P2, P3, which have peak time demands of 3, 5, 7 respectively. What is the minimum value of m that ensures that deadlock will never occur?
   1. 13
   2. 15
   3. 7
   4. 8

Ans: 13

1. On a system using non-preemptive scheduling, processes with expected run times of 7, 9, 5, 12 are in the ready queue. In what order there is minimum waiting time?
   1. 12, 9, 7, 5
   2. 9, 7, 12, 5
   3. 5, 7, 9, 12
   4. 7, 5, 12, 9

Ans: c

1. Which of the following RAID level provides the highest Data Transfer Rate?
   1. RAID 3
   2. RAID 1
   3. RAID 4
   4. All of the above

Ans: b

1. The operating system may periodically collect all the free memory spaces to form contiguous block of free space. This is called
   1. Garbage collection
   2. Concatenation
   3. Compaction
   4. Both b and c

Ans: a

1. At a particular time of computation, the value of a counting semaphore is 14. Then 17P operations and “x” V operations were performed on this semaphore. If the final value of semaphore is 8; what is the value of x?
   1. 11
   2. 9
   3. 6
   4. 23

Ans: a

1. In a paged memory, the page hit ratio is 0.30. The time required to access a page in secondary memory is equal to 120 ns. The time required to access a page in primary memory is 20 ns. The average time required to access a page is
   1. 90
   2. 42
   3. 84
   4. None of these

Ans: a

1. Which LINUX command is used to make all files and sub directories in the directory “job” executable by all users?
   1. chmod -R a+x job
   2. chmod -R u+x job
   3. chmod - -R a+x
   4. All of the above

Ans: a

1. Consider a virtual page reference string 1, 2, 3, 2, 4, 2, 5, 2, 3, 4. Suppose LRU page replacement algorithm is implemented with 3 page frames in main memory. Then the number of page faults are
   1. 5
   2. 9
   3. 7
   4. 10

Ans: c

1. Consider a disk pack with 32 surface, 64 tracks and 512 sectors per track. 256 bytes of data are stored in a bit serial manner in a sector. The number of bits required to specify a particular sector in the disk is
   1. 15
   2. 19
   3. 20
   4. 23

Ans: c

1. Which system call creates new process in UNIX?
   1. new
   2. create
   3. fork
   4. spawn

Ans: c

1. A software to create a job queue is called
   1. Spooler
   2. Linkage
   3. Driver
   4. System call

Ans: a

1. Which Linux command is used to display the operating system name?
   1. os
   2. os -name
   3. uname
   4. kenel -info

Ans: c

1. Which option of ls command used to view file inode number?
   1. -lrth
   2. -o
   3. -n
   4. -i

Ans: d

1. Which command is used to view compressed text file contents?
   1. Cat
   2. type
   3. print
   4. zcat

Ans: c

1. Consider the following CPU processes with arrival times (in ms) and length of CPU bursts (in ms) as given below:

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | 0 | 7 |
| P2 | 3 | 3 |
| P3 | 5 | 5 |
| P4 | 6 | 2 |

If the preemptive shortest remaining time first scheduling is used to schedule the processes, then the average waiting time across all processes is\_\_\_\_

* 1. 3
  2. 4
  3. 5
  4. 5

Ans: a

1. Which command is used to extract intermediate result in a pipeline?
   1. tee
   2. extract
   3. exec
   4. None of these

Ans: a

1. Which command is used to display disk consumption of a specific directory?
   1. dh
   2. du
   3. size
   4. dd

Ans: b

1. Which command is used to determine the path of an executable file?
   1. which
   2. find
   3. loc
   4. where

Ans: a

1. Agile Software Development is based on
   1. Incremental development
   2. Iterative development
   3. Linear development
   4. Both a and c

Ans: d

1. How many phases are there in Scrum?
   1. 2
   2. 3
   3. 4
   4. 5

Ans: b

1. Agile project management is classified into how many frameworks?
   1. 2
   2. 3
   3. 5
   4. None of these

Ans: a

1. A product is built in a series of repetitions called\_\_\_\_
   1. Scrum
   2. Kanban
   3. Sprints
   4. Both a and b

Ans: c

1. Which software development methodology is used in Agile?
   1. Linear
   2. Incremental
   3. Waterfall
   4. Incremental and Iterative

Ans: d

1. Which of the following is not an agile method?
   1. 4GT
   2. XP
   3. AUP
   4. None of these

Ans: a

1. Which of the following prototypes does not associated with Prototyping Model?
   1. Domain
   2. Vertical
   3. Horizontal
   4. Diagonal

Ans: d

1. What is the major drawback of the spiral model?
   1. Higher amount of risk analysis
   2. Does not work well for smaller projects
   3. Additional functionalities are added later on
   4. Strong approval and documentation control

Ans: b

1. The \_\_\_\_\_\_\_\_\_\_ model helps in representing the system's dynamic behavior.
   1. Object model
   2. Context model
   3. Behavioral model
   4. Data model

Ans: c

1. Which of the following word correctly summarized the importance of software design?
   1. Quality
   2. Complexity
   3. Efficiency
   4. Accuracy

Ans: a

1. Which of the following is a dense index?
   1. Secondary index
   2. Primary index
   3. Cluster index
   4. Both a and b

Ans: a

1. Which commands are used to control the access over data in relational database?
   1. CASCADE, MVD
   2. GRANT, REDO
   3. QUE, QUIST
   4. GRANT, REVOKE

Ans: d

1. A view of database that appears to an application program is known as
   1. Schema
   2. Table
   3. Virtual table
   4. Information

Ans: c

1. Which operation is used to extract specific columns from a table?
   1. Select
   2. Project
   3. Extract
   4. Cut

Ans: b

1. Consider a database relation R(A, B, C, D) where the domains of A, B, C and D include only atomic values. The following functional dependencies can be inferred and hold A -> C, B -> D. The relation is in
   1. 1NF but not in 2NF
   2. 2NF but not in 3NF
   3. 3NF
   4. 2NF and 3NF

Ans: a

1. What does data dictionary identify?
   1. Field type
   2. Field format
   3. Field name
   4. All of the above

Ans: d

1. Which of the following concurrency control protocol ensures both conflict serializability and free from deadlock?
   1. 2 Phase locking
   2. Timestamp ordering
   3. Lock
   4. Both a and b

Ans: b

1. The join operation can be defined as:
   1. A cartesian product of two relation followed by selection
   2. A union of two relation followed by selection
   3. A product of two relation
   4. None of these

Ans: a

1. If D1, D2, D3…Dn are domains in a relational model, then the relation is a table, which is a subset of
   1. D1+D2+D3+….+Dn
   2. D1xD2xD3x…xDn
   3. D1∩D2∩D3∩…∩Dn
   4. D1∏D2∏D3∏…∏Dn

Ans: b

1. In generalization, the difference between members of an entity is
   1. Minimized
   2. Maximized
   3. Both a and b
   4. Optimal

Ans: a

1. Which of the following is/are the component of Hadoop?
   1. YARN
   2. HDFS
   3. MAP reduce
   4. All of the above

Ans: d

1. Hadoop works with number of related tools. The common tools include:
   1. Map reduce, H base, Hive
   2. Map reduce, Hummer, Heron
   3. MySQL cluster, Map reduce, HPC
   4. All of the above

Ans: a

1. Consider the relation schema

weather (city, temperature, humidity, condition)

location(city, country)

Find all the cities with temperature, condition and humidity whose humidity is in the range of 63 to 79

* 1. select \* from weather where humidity IN (63 to 79)
  2. select \* from weather where humidity NOT IN (63 and 79)
  3. select \* from weather where humidity BETWEEN 63 and 79
  4. select \* from weather where humidity NOT BETWEEN 63 and 79

Ans: c

1. Cascading rollback is one in which
   1. Single transaction failure leads to single transaction roll back
   2. If all transaction are failed then only all transaction are rolled back
   3. Single transaction failure leads to all transaction roll back
   4. None of these

Ans: c

1. Which of the following is not an information gathering technique?
   1. Record review
   2. Observation
   3. Requirement analysis
   4. Questionnaire

Ans: c

1. A context diagram is a
   1. Level 1 DFD
   2. Level 2 DFD
   3. Level 0 DFD
   4. Level 3 DFD

Ans: c

1. When a segment of a DFD exhibits data flow, it is called
   1. Transform flow
   2. Incoming flow
   3. Information flow
   4. None of these

Ans: a

1. The logical relationship among individual elements of data is
   1. Data structure
   2. Data representation
   3. Data system
   4. Data view

Ans: b

1. Which are the tools not used for system analysis?
   1. System test data
   2. Decision table
   3. DFD
   4. Flowchart

Ans: d

1. Which of the following is an incremental model?
   1. RAD model
   2. Prototype model
   3. Spiral model
   4. All of these

Ans: c

1. Match the following:

|  |  |
| --- | --- |
| (P) Condition coverage | (i) Black box testing |
| (Q) Equivalence class partitioning | (ii) System testing |
| (R) Volume testing | (iii) White box testing |
| (S) Alpha testing | (iv) Performance testing |

* 1. P-ii, Q-iii, R-I, S-iv
  2. P-iii, Q-iv, R-ii, S-i
  3. P-iii, Q-I, R-iv, S-ii
  4. P-iii, Q-I, R-ii, S-iv

Ans: c

1. With respect to software testing, consider a flow graph G with one connected component. Let E be the number of edges, N be the number of nodes, and P be the number of predicate nodes of G. Consider the following four expressions:
2. E-N+P
3. E-N+2
4. P+2
5. P+1

The cyclomatic complexity of G is given by

* 1. 1 or 3
  2. 2 or 3
  3. 2 or 4
  4. 1 or 4

Ans: c

1. In unit testing of a module, it is found that for a set of test data, at the maximum 80% of the code alone were tested with the probability of success 0.8. The reliability of the module is
   1. 0.2
   2. 0.6
   3. At most 0.64
   4. At most 0.16

Ans: c

1. To execute all loops at their boundaries and within their operational bounds is an example of
   1. White box testing
   2. Black box testing
   3. Alpha testing
   4. None of these

Ans: a

1. The extent to which software can continue to operate correctly despite the introduction of invalid inputs is called as
   1. Reliability
   2. Fault tolerance
   3. Robustness
   4. Portability

Ans: c

1. Activities which ensure that the software has been built, is traceable to customer requirement is covered as part of
   1. Verification
   2. Maintenance
   3. Accepting
   4. Validation

Ans: d

1. A testing method which is normally used as the acceptance test for a software is
   1. Beta testing
   2. Regression testing
   3. System testing
   4. Integration testing

Ans: c

1. Which of the following testing methods uses fault simulation technique?
   1. Mutation testing
   2. Unit testing
   3. Beta testing
   4. All of the above

Ans: a

1. The advantage of better testing in software development is in
   1. Iterative model
   2. Protype model
   3. Waterfall model
   4. All of the above

Ans: a

1. Which of the following is a white box testing technique?
   1. Equivalence class testing
   2. State based testing
   3. Data flow testing
   4. None of these

Ans: c

1. Which one of the following is not typically provided by source code management software?
   1. Syntax highlighting
   2. Synchronization
   3. Versioning and revision history
   4. Project forking

Ans: a

1. A software system crashed 20 times in the year 2022 and for each crash it took 2 minute to restart. What is the software availability in that year?
   1. 96.9924%
   2. 99.9924%
   3. 98.9928%
   4. 97.9789%

Ans: b

1. The COCOMO model is used for\_\_\_\_\_
   1. Software cost estimation
   2. Software cost evaluation
   3. Software cost approximation
   4. All of the above

Ans: a

1. The relationship of data elements in a module is called
   1. Cohesion
   2. Modularity
   3. Coupling
   4. All of the above

Ans: a

1. Which one of the following is not a step of requirement engineering?
   1. Requirement design
   2. Requirement documentation
   3. Requirement analysis
   4. None of these

Ans: a

1. Testing of software with actual data and in actual environment is called
   1. Alpha testing
   2. System testing
   3. Final testing
   4. Beta testing

Ans: d

1. In a function oriented design, we
   1. Maximize cohesion and minimize coupling
   2. Maximize cohesion and maximize coupling
   3. Minimize cohesion and minimize coupling
   4. Minimize cohesion and maximize coupling

Ans: a

1. Reliability of a software is directly dependent on
   1. Number of errors present
   2. Quality of design
   3. User requirement
   4. Software engineering experience

Ans: a

1. Emergency fixes is known as patches are result of
   1. Adaptive maintenance
   2. Corrective maintenance
   3. Perfective maintenance
   4. None of these

Ans: b

1. Software risk estimation involves:
   1. Risk magnitude and risk impact
   2. Risk probability and risk impact
   3. Risk maintenance and risk impact
   4. Risk reduce and risk find

Ans: b