

**IoT-2061**  
**Examination –April/May- 2023**  
**B.Tech. VI Sem : Internet of Things**  
**Operating System**

Time : 3 Hrs

Max. Marks : 70  
Min. Marks : 22

**Note:** Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

**Word limit be observed as follows:**

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Part c – Max 100 words and      Part d – Max 400 words.

**Word limit NOT to be followed for diagram, numerical, derivation.**

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|-----|--|----|
| Q.1 | (a) What are the goals of an Operating System?   | 02 |
|     | (b) What is 'Monitor'? Briefly describe its role in Distributed Operating System.  | 02 |
|     | (c) What is multiprogramming? How it is different from multiprocessing.  | 03 |
|     | (d) Discuss the properties of the following types of operating system:<br>(i) Interactive (ii) Network (iii) Distributed | 07 |

**OR**

What is batch operating system? Compare it with multiprogramming OS. Also writes its drawbacks. 07

- |     |  |    |
|-----|--|----|
| Q.2 | (a) Explain Binary Semaphores and Counting Semaphores.   | 02 |
|     | (b) Why it is important for a scheduler to distinguish between I/O-bound programs from CPU-bound programs? | 02 |
|     | (c) What is critical section problem? How it is solved in OS.  | 03 |
|     | (d) Consider the following table:-   | 07 |

| Process | Arrival Time (ms) | Burst Time (ms) |
|---------|-------------------|-----------------|
| P1      | 0                 | 8               |
| P2      | 1                 | 4               |
| P3      | 2                 | 9               |
| P4      | 3                 | 5               |

Provide the schedule using preemptive shortest job first (SJF).

- (i) Prepare Gantt chart for the above.
- (ii) Calculate average turn-around & waiting time for the same.

**OR**

What are the conditions necessary for the deadlock to occur and methods for handling it? Is it possible that deadlock can occur if one process is running only? Justify. 07

- Q.3 (a) What is swapping? 03  
 (b) Explain the inverted page table mechanism of memory management. 03  
 (c) Explain internal and external fragmentation. 03  
 (d) Find the total no. of page faults and hit ratio using FIFS, Optimal and LRU page replacement algorithm for the given reference string. (Assuming frame size =3 & 4 and frames are initially empty). 07

**Reference String= 2,2,0,1,0,7,0,1,5,3,8,5,7,7,4**

**OR**

A computer system has a 36-bit virtual address space with a page size of 8K, and 4 bytes per page table entry. 07

1. How many pages are in the virtual address space?
2. What is the maximum size of addressable physical memory in this system?
3. If the average process size is 8GB, would you use a one-level, two-level, or three-level page table? Why?

- Q.4 (a) What is an interface? 02  
 (b) Describe different access methods used for file. 02  
 (c) How do you choose an optimal technique among the various disk scheduling techniques? Explain. 03  
 (d) A disk contains 200 tracks from (0-199). Request queue contains request no. in the following sequence: 98, 183, 37, 122, 14, 124, 65, 67 and current position of the head is 53. Calculate the total no. of tracks movements using FCFS and LOOK algorithm. (Assuming head moving towards higher value). 07

**OR**

Describe the approaches used in free space management? 07

- Q.5 (a) Explain firewall structure in brief. 02  
 (b) What are the principles of protection? 02  
 (c) What is user authentication? Give name of methods used to prevent breach of it. 03  
 (d) How do we use cryptography as a security tool? Explain. 07

**OR**

What are the security problems in an OS? What role Access Matrix plays in protecting resources in an OS. 07

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**CS-1852****Examination -Nov- 2022**
**B.Tech. V Sem : Computer Science & Engineering  
Compiler Design**

Time : 3 Hrs

Max. Marks : 70

Min. Marks : 22

**Note:** Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

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- Q.1 (a) Differentiate compiler and interpreter. 02  
 (b) Point out why input buffering used in lexical analysis? 02  
 (c) Apply bootstrapping to develop a compiler for a new high level language P on machine N. 03  
 (d) Construct Minimum state DFA equivalent to regular expression. 07  
 $r = (a + b)^* abb$

**OR**

Solve the given expressions  $a := b + c^* 4$  with different phases of the compiler. 07

- Q.2 (a) Define Kernel items and Non-kernel items with example. 02  
 (b) Eliminate the left recursion for the given grammar. 02  
 $S \rightarrow Aa/b$   
 $A \rightarrow Ae/Sd$   
 (c) Consider the grammar 03  
 $S \rightarrow (D)/a$   
 $D \rightarrow D, S/S$   
 Derive string ((a, a), (a, a)) by left most derivation and Construct Parse tree.  
 (d) Prepare the following grammar is LL(1). 07  
 $S \rightarrow AaAb/BbBa$   
 $A \rightarrow \epsilon$   
 $B \rightarrow \epsilon$

**OR**

Find Canonical Parsing table for a given grammar. 07

$S \rightarrow CC$

$C \rightarrow c \mid C$

- Q.3 (a) What are the advantages of using an intermediate language?  
 (b) Compare synthesized attribute and inherited attribute.  
 (c) Draw the syntax tree for the following assignment statement.

$A = b * -c + b * -c$

- (d) Write quadruples, triples and indirect triples for the expression 07  
 $(a + b) * (c + d) - (a+b+c)$

**OR**

Show the intermediate code for the following code statement. 07

While ( $i < 10$ )  
 If ( $i \% \% 2 == 0$ )  
 Evensum=Evensum+i  
 Else  
 Oddsum=Oddsum+i

- Q.4 (a) Comparison between call by value and call by reference. 02  
 (b) How the activation record is pushed into the stack? 02  
 (c) How symbol table space can be reused? 03  
 (d) What are the storage allocation scheme at run time? 07

**OR**

How to design call sequences and analyze the principles of activation records. 07

- Q.5 (a) Illustrate the concepts of copy propagation. 02  
 (b) Give the uses of gen and kill functions. 02  
 (c) Give the main idea of dead code elimination and constant folding. 03  
 (d) Construct DAG for the following C code segment: 07

$a = b + c;$   
 $e = a + 1;$   
 $d = b + c;$   
 $f = d + 1;$   
 $g = e + f;$

**OR**

Describe in detail about the flow of control optimization. 07

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**CS-1853****Examination –Nov- 2022**
**B.Tech. V Sem : Computer Science & Engineering**  
**Analog and Digital Communication**

Time : 3 Hrs

Max. Marks : 70  
Min. Marks : 22

**Note:** Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

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**Word limit NOT to be followed for diagram, numerical, derivation.**

- Q.1 (a) What is Correlation? 02  
 (b) Differentiate Energy and Power Signals. 02  
 (c) State and prove Time shifting property of Fourier transform. 03  
 (d) Find the Fourier Transform of the following functions and draw the spectrum: 07  
 (i)  $u(t) \cdot \cos\omega_0 t$   
 (ii) Sgn(t)

**OR**

What is Convolution? State and prove Time convolution theorem? 07

- Q.2 (a) Differentiate SSB-SC and DSB-SC. 02  
 (b) Explain the synchronous detection method of DSB-SC signals. 02  
 (c) What is Modulation? Explain the Need of Modulation? 03  
 (d) Explain the generation of AM-LC waveforms for Modulation index  $M_a=1$ ,  $M_a<1$  and  $M_a>1$ . 07

**OR**

An Amplitude Modulated signal is given by- 07

$$\phi_{AM}(t) = 12 \cos(4\pi \cdot 10^6 \cdot t) + 6 \cos(4\pi \cdot 10^6 \cdot t) \cos(2\pi \cdot 10^4 \cdot t) + 4 \cos(4\pi \cdot 10^6 \cdot t) \cos(6\pi \cdot 10^4 \cdot t) \text{ Volt}$$

Find the various frequency components present and the corresponding modulation indices. Draw the line spectrum and find the bandwidth.

- Q.3 (a) What do you mean by Angle Modulation? 02  
 (b) Define Frequency deviation. 02  
 (c) Draw and explain the block diagram of PCM system. 03  
 (d) A single tone FM signal is given by- 07  
 $e_{FM} = 10 \sin(16\pi \times 10^6 t + 20 \sin 2\pi \times 10^3 t) \text{ Volts}$   
 Find the modulation index, modulating frequency deviation and carrier frequency of the FM signal.

**OR**

What is FM? Drive an expression for NBFM?

- Q.4** (a) What is Noise? 03  
 (b) What do you mean by Line Codes? 03  
 (c) Drive the expression for generation of FSK. 03  
 (d) Explain the generation and detection of PSK. 07

**OR**

Explain with neat diagram working of Superhetrodyne receivers for AM wave.

07

- Q.5** (a) Define Entropy. 02  
 (b) What do you mean by Rate of Information? 02  
 (c) Discuss type of Channels. 03  
 (d) Apply the Shannon-Fano Coding procedure for the following messages, ( $M = 2$ ). 07

Given:  $[X] = [x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7 \ x_8]$

$[P] = [1/4, 1/8, 1/16, 1/16, 1/16, 1/4, 1/16, 1/8]$

And find the coding efficiency.

**OR**

Apply Huffman - Coding procedure for  $M = 2$ .

07

Given:  $[X] = [x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7 \ x_8]$

$[P] = [0.1, 0.25, 0.15, 0.05, 0.15, 0.1, 0.05, 0.15]$

And find the coding efficiency.

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CS-1854

Examination –Nov- 2022

**B.Tech. V Sem : Computer Science & Engineering**  
**Computer Graphics and Multimedia**

Time : 3 Hrs

 Max. Marks : 70  
 Min. Marks : 22

**Note:** Total number of questions are 05. All Questions are compulsory. Each Question has 4 parts (a, b, c, d). Part a, b & c are compulsory while Part d has internal Choice. Assume missing data, if any.

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Part a – Max 50 words,      Part b – Max 50 words,

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- Q.1 (a) Discuss different categories of Computer Graphics. 02  
 (b) Explain different Standards of Graphics System. 02  
 (c) Differentiate between Flood Fill and Boundary Fill algorithms. 03  
 (d) Explain the working of CRT with the help of diagram. Give the function of each component of CRT. 07

**OR**

A system with 24 bits per pixel and resolution of 1024 by 1024. Calculate the size of frame buffer in megabytes? 07

- Q.2 (a) Derive DDA line drawing algorithm. 02  
 (b) Why is homogeneous co-ordinate used for transformation computation in computer graphics? 02  
 (c) Show that the composition of two rotation is additive by concatenating the matrix representatives. 03  
 (d) Prove that rotation and scaling transformation are not commutative. Find the condition under which they are commutative. 07

**OR**

Obtain Mirror reflection of  $\Delta ABC$  about the line passing through (4,6) and (10,15) where A,B and C have coordinate values (0,10), (0,50) and (-20,30) respectively. 07

- Q.3 (a) What do you mean by projection? Discuss different types of projections. 02  
 (b) Explain the z-buffer algorithm for creating 3D illusion on 2D screen. 02  
 (c) Write 3D rotation transformation matrix? 03  
 (d) Consider a line segment AB with end point A(4, 3, 2) and B(8, 3, 2). Find out perspective projection of AB onto the plane  $x = 0$  from the centre of projection at  $x = -4$ . 07

**OR**

A Bezier curve is to be drawn using the rectangular points A(40,40), B(10,40), C(60,50) and D(60,0). Find the equation of Bezier curve and midpoint of this curve. Also draw its rough sketch.

- |   |    |
|---|----|
| Q.4 (a) What is a color model?  | 02 |
| (b) What steps are required to shade an object using Gouraud Shading algorithm.                           | 02 |
| (c) Describe phong shading model. How it is more accurate than gouraud shading model.                     | 03 |
| (d) Explain the following color models with necessary equations and applications:<br>(a) RGB      (b) CMY | 07 |

**OR**

Derive an illumination model for diffused and specular reflections. 07

- |   |    |
|---|----|
| Q.5 (a) Discuss about various authoring tools.                                    | 02 |
| (b) Discuss in brief about multimedia hardware.                                   | 02 |
| (c) Briefly Describe different file formats.                                      | 03 |
| (d) Define Multimedia? Write down the characteristics of multimedia presentation? | 07 |

**OR**

Explain various multimedia compression standards. 07

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**CS-1855**

**Examination -Nov- 2022**

**B.Tech. V Sem : Computer Science & Engineering  
Information Storage and Management**

Time : 3 Hrs

Max. Marks : 70  
Min. Marks : 22

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- Q.1 (a) What is structured and unstructured data? 02  
(b) Explain Information Life cycle. 02  
(c) Write core elements of Data Center. 03  
(d) How businesses use their information assets to derive competitive advantage and new business opportunities. 07

**OR**

Which components constitute the disk service time? Which component contributes the largest percentage of the disk service time in a random I/O operation? 07

- Q.2 (a) What is RAID? 02  
(b) Why is RAID 1 not a substitute for a backup? 02  
(c) Write Components of Intelligent storage system. 03  
(d) The average I/O size of an application is 64 KB. The following specifications are available from the disk manufacturer: average seek time = 5 ms, 7200 RPM, and transfer rate = 40 MB/s. Determine the maximum IOPS that could be performed with this disk for the application. Using this case as an example, explain the relationship between disk utilization and IOPS. 07

**OR**

Why is an intelligent storage system an integral part of every data center? 07

- Q.3 (a) What is zoning? 02  
(b) What is JBOD? 02  
(c) Describe the process of assigning an FC address to a node when logging on to the network for the first time. 03  
(d) What is zoning? Discuss a scenario: 07  
    a. Where WWN zoning is preferred over port zoning.  
    b. Where port zoning is preferred over WWN zoning.

**OR**

Compare various data center protocols that use Ethernet as the physical medium for transporting storage traffic. 07

- Q.4 (a) What is Hybrid Storage? 02  
(b) Explain REST and SOAP and their implementations. 02  
(c) How does flow control work in an FC network? 03  
(d) List and explain the considerations in using tape as the backup technology. What are the challenges in this environment? 07

**OR**

How does iSCSI handle the process of authentication? 07

- Q.5 (a) What is Cloud Computing? 02  
(b) What are the essential characteristics of cloud computing? 02  
(c) Explain the Cloud Services? 03  
(d) How does cloud computing bring in business agility? 07

**OR**

Explain various security concerns and measures in the virtualized and cloud environment. 07

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CS-1852

Examination -April/May- 2023

**B.Tech. V Sem : Computer Science & Engineering**  
**Compiler Design**

Time : 3 Hrs

 Max. Marks : 70  
 Min. Marks : 22

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- |     |  |    |
|-----|--|----|
| Q.1 | (a) Define Lexeme with example.                            | 02 |
|     | (b) Write different function of lexical Analyzer.          | 02 |
|     | (c) Write the difference between compiler and Interpreter. | 03 |
|     | (d) Construct DFA for regular expression $a+b^*a+ab$ .     | 07 |

**OR**

|  |    |
|--|----|
| What is compiler? Write different phases of compiler and explain each of them. | 07 |
|--|----|

- |     |   |    |
|-----|---|----|
| Q.2 | (a) Define handle and handle pruning.                 | 02 |
|     | (b) Remove Left factoring of given Grammar.           | 02 |
|     | S → iEtS / iEtSeS / a                                 |    |
|     | E → b   |    |
|     | (c) Explain operator precedence grammar with example. | 03 |
|     | (d) Construct Top Down Parser for the given Grammar.  | 07 |
|     | E-> E+T / T   |    |
|     | T-> T*T / F   |    |
|     | F-> (E) / id  |    |

**OR**

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|--|----|
| Explain the Chomsky Hierarchy in detail. | 07 |
|--|----|

- |     |  |    |
|-----|--|----|
| Q.3 | (a) Differentiate inherited and synthesized attributes with an example.                                      | 02 |
|     | (b) Discuss the advantages of writing intermediate codes.  | 02 |
|     | (c) Give Three-Address Code and it's quadruple representation for the assignment:<br>$a = b * - c + b * - c$ | 03 |

(d) Translate the assignment  $x := A[y,z]$  into three address statement. 07

OR

How syntax directed translation scheme is implemented? Explain with an example. 07

Q.4 (a) Draw the typical structure of an activation record. 02

(b) Under what circumstances does external fragmentation happens. 02

(c) Explain the concept of type checking and type conversion with an example. 03

(d) Compare static versus dynamic memory allocation. 07

OR

Describe in detail about stack allocation of space and heap Management. 07

Q.5 (a) Copy propagation leads to dead-code elimination, justify this with example. 02

(b) What is Peephole optimization? 02

(c) What is dead code? Explain with an example. 03

(d) Explain the simple code generator and generate target code sequence for the following statement  $d:=(a-b)+(a-c)+(a-c)$ . 07

OR

What are basic blocks? Write the algorithm for partitioning into-blocks. 07

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AI-2041

Examination –April/May- 2023

**B.Tech. IV Sem : Artificial Intelligence & Data Science  
Operating System**

Time : 3 Hrs

Max. Marks : 70  
Min. Marks : 22

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- Q.1 (a) Which type of errors will be handled by the Operating System? 02  
 (b) Write down desirable characteristics of operating system. 02  
 (c) Discuss the pros and cons of buffer cache. 03  
 (d) Discuss different types of operating system with examples of each. 07

**OR**

What are the functionalities of Operating System? Explain in detail. 07

- Q.2 (a) What is System Calls? 02  
 (b) Explain the problem solved by Dijkstra Banker's algorithm. 02  
 (c) Explain different criteria for evaluating the CPU scheduling algorithm. 03  
 (d) Find out the average waiting time for the processes arrived in the order x,y,z,w and scheduled under FCFS scheduling with burst time 8,15,10 and 7 respectively. 07

**OR**

What is the difference between average waiting time of problem solved by FCFS and Non Preemptive SJF for 4 process p1, p2, p3 and p4 and their burst time is 6,8,7,3 respectively? 07

- Q.3 (a) What is thrashing? 02  
 (b) Differentiate between external and internal fragmentation. 02  
 (c) A cache memory needs an access time of 40 ns and main memory 120 ns, what is the average access time of CPU (assume hit ratio = 80%)? 03  
 (d) In fixed size partitioning if four process comes p1 with size 357, p2 with size 210, p3 with size 468 and p4 with size 491 And vacant memory blocks are 200 ,400, 600, 500,300,250 Find out the total internal fragmentation in First Fit approach, also which approach satisfy all the processes? 07

**OR**

Consider the main memory with capacity of 4 page frames. Assume that the pages of a process are referenced in the order as given below: 07

1,3,4,4,3,2,1,7,5,6,4,2,1,2. Which one is better FIFO or LRU and why?

- Q.4 (a) What is Disk Scheduling? 02  
(b) Discuss various file allocation and access methods. 02  
(c) Find capacity of disk with 16 platters, 2 surfaces per platter, 1K tracks per surface, 2K sectors per track and 2048 Bytes per sector. 03  
(d) Assuming that the disk head is located initially at 30, find the number of disk moves required with FCFS if the disk queue of I/O block requests are 100,40,15,125,73,76. 07

**OR**

A disk has 300 cylinders (0 to 299). If the initial position of the read-write head is at cylinder 101. Calculate the total head movement by using SSTF disk scheduling algorithm for the read request sequence: 124,46,200,85,240,190,270. 07

- Q.5 (a) What is cryptography? 02  
(b) Differentiate between program threats and network threats. 02  
(c) What is the difference between worm and virus? 03  
(d) How does UNIX provide file protection? Explain. 07

**OR**

Discuss various security threats in file system of Operating System. 07

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**CS-1855****Examination –April/May- 2023**
**B.Tech. V Sem : Computer Science & Engineering**  
**Information Storage and Management**

Time : 3 Hrs

Max. Marks : 70  
Min. Marks : 22

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- |     |  |    |
|-----|--|----|
| Q.1 | (a) What are the attributes of big data?   | 02 |
|     | (b) Explain Information Life cycle.  | 02 |
|     | (c) Virtualization is a technique of abstracting physical resources. Explain.                                  | 03 |
|     | (d) Discuss the benefits of information-centric storage architecture over server-centric storage architecture. | 07 |

**OR**

- |  |    |
|--|----|
| What are the advantages of a virtualized data center over a classic data center? | 07 |
|--|----|

- |     |  |    |
|-----|--|----|
| Q.2 | (a) Explain Hot Spares.  | 02 |
|     | (b) What is Parity?  | 02 |
|     | (c) Write Components of Intelligent storage system.  | 03 |
|     | (d) The average I/O size of an application is 64 KB. The following specifications are available from the disk manufacturer: average seek time = 5 ms, 7200 RPM, and transfer rate = 40 MB/s. Determine the maximum IOPS that could be performed with this disk for the application. Using this case as an example, explain the relationship between disk utilization and IOPS. | 07 |

**OR**

- |   |    |
|---|----|
| Analyze various cache parameters: cache page size, read versus write cache allocation, cache prefetch size, and write aside size. | 07 |
|---|----|

- |     |  |    |
|-----|--|----|
| Q.3 | (a) What is zoning?  | 02 |
|     | (b) How does flow control work in an FC network?   | 02 |
|     | (c) How does the use of jumbo frames affect the NAS performance?   | 03 |
|     | (d) Compare various data center protocols that use Ethernet as the physical medium for transporting storage traffic. | 07 |

**OR**

- |  |    |
|--|----|
| How does file-level virtualization ensure nondisruptive file mobility? | 07 |
|--|----|

- Q.4 (a) What is Hybrid Storage? 02  
(b) Explain REST and SOAP and their implementations. 02  
(c) What are the considerations for implementing synchronous remote replication? 03  
(d) Explain the storage and retrieval process for block, file, and object access in a unified storage system. 07

**OR**

List and explain the considerations in using tape as the backup technology. What are the challenges in this environment? 07

- Q.5 (a) What is grid computing? 02  
(b) Explain the Cloud Services. 02  
(c) Explain cloud orchestration. 03  
(d) How does cloud computing bring in business agility? 07

**OR**

What are the essential characteristics of cloud computing? 07

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