Sinhgad Technical Education Society’s

SINHGAD COLLEGE OF ENGINEERING

**DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGINEERING**

**SYSTEM PROGRAMMING AND OPERATING SYSTEMS**

**QUESTION BANK**

**TE (E&TC)**

1. Define language processor. Explain various language processing tools.
2. Explain different phases of language processing.
3. Explain lexical, syntax and semantic analysis with one example.
4. Discuss the problems associated with conventional language processing and importance of intermediate representation.
5. Discuss the front end and back end of toy compiler.
6. Discuss different data structures used in language processing.
7. What is scanning in language processing? How to use deterministic finite state automaton (DFA) to recognize integer strings?
8. Describe the language processor in detail with various language processing activities.
9. What do you understand by Grammar? Explain the use of Terminal and Non-Terminal in representing grammar.
10. Explain Allocation data Structures used in language processing.
11. What is a LITERAL ? What is its advantage in assembly language programming ?
12. Discuss the top down parsing algorithm for parsing of source string x+y\*z.
13. Describe operator precedence matrix used in parsing with the operator precedence parsing algorithm.
14. Using operator precedence parsing algorithm, show step by step procedure to construct abstract syntax tree (AST) for following expression

COST=RATE\*(START-FINISH)+2\*RATE\*(START-FINISH-100)

1. Discuss the design specification of assembler along with various data structures required in each phase.
2. Explain assembler pass- I algorithm.
3. Explain assembler pass-II algorithm along with necessary data structures.
4. Discuss the error reporting mechanism in assembler. Compare error reporting in pass-I and pass-II.
5. What are language processor development tools? Explain the working of Lex and YACC.
6. Define following terms and explain where it is used with examples.

(i)DFA (ii)Regular Expression (iii)Forward Reference

(iv)Back Tracking

1. What is a assembler? Explain two pass assembler along with the schematic diagram.
2. Enlist the different types of errors that are handled by PASS-I and PASS-II of a TWO PASS ASSEMBLER.
3. Explain completely the processing of LTORG, ORIGIN statements by PASS-I and PASS-II of a Two Pass Assembler.
4. What is macro? What are the major components of macro?
5. Explain the process of macro expansion with one example.
6. How nested macro calls are to be handled?
7. What are the advanced macro facilities?
8. Explain the statements used for alteration of flow during macro expansion?
9. What is the use of expansion time variables in macro expansion?
10. Describe the process of conditional expansion of macro with example.
11. What are the different data structures required for macro expansion? Explain in brief.
12. Explain the macro pass-I algorithm.
13. What would the content of MNT, PNTAB, EVNTAB and SSNTAB after procession following macro.



1. Describe macro pass II algorithm.
2. What is the importance of keyword parameter default table (KPDTAB)?
3. What is the use of sequencing symbol table (SSTAB)?
4. Explain the process of Macro Expansion with relevant data structures.
5. Explain the use of Register Descriptor and Operand descriptor.
6. What are the differences between Compiler and Interpreter?
7. List down various code optimization techniques. Explain any two techniques in detail with example.
8. Explain the process of alteration of flow of control during macro expansion.
9. List down the steps in designing a Macro Preprocessor.
10. Explain the advance macro facilities :

i) Alteration of flow of control during expansion.

ii) Expansion time variables.

iii) Attributes of parameters.

1. Explain parameter passing mechanisms :

i) call by value

ii) call by result

iii) call by references

iv) call by name.

1. Explain phases of compiler with example.
2. Define macro. Explain with suitable example lexical expansion of macro.
3. What are the differences between Macros and functions?
4. Explain in detail various phases of a compiler.
5. Draw a neat flowchart for MACRO processor to handle nested macro definitions.
6. Compare Compiler and Interpreter.
7. What are the functions to be performed by loader?
8. Explain absolute loader operation.
9. How subroutine linkages are handled by loaders?
10. What are disadvantages of absolute loader? How these can overcome by relocation loaders?
11. Describe relocation loaders with advantages and disadvantages.
12. What are the various data structures used in direct linking loaders?
13. Which information should be given by assembler to direct linking loader?
14. Describe direct linking loader.
15. What do you mean by dynamic linking and loading?
16. Write a short note on MS-DOS linker.
17. Why program relocation is required and how is it performed?
18. Explain the five different types of editor with their applications?
19. In case of a Direct Linking Loader, what is the information required to be passed by a translator to the loader.
20. Explain the need of a linker in program development.
21. List down the components of a programming environment. Explain any two components in detail.
22. Explain the software tools for program development.
23. What are loaders ? List the different type of loader schemes. Explain compile and Go-loader scheme.
24. Explain the Editor structure with different text editors.
25. Explain with diagram program execution. Discuss the terminologies.

i) Translated origin

ii) Link origin

iii) Load origin.

1. Explain the design of a direct linking loader. Also explain all required data structures.
2. What is an operating system? Explain the basic functions of O.S.
3. Explain various types of OS.
4. Explain structure of OS.
5. What are basic services and functions of OS?
6. Define process. Explain various states of process with process state diagram for five state process models.
7. Explain the difference between program and process.
8. Explain processes and threads in details.
9. What is process context switching? Explain process control block.
10. Explain interprocess communication? Explain different IPC problems.
11. State IPC problems. What are the methods to avoid IPC problems?
12. Explain dead lock. Explain different methods to avoid deadlock.
13. What is scheduling? Explain preemptive and non-preemptive scheduling in details.
14. Explain
    * 1. Semaphores
      2. Mutex
      3. Mailboxes
      4. Pipes
15. Explain Ostrich algorithm.
16. Explain functions of an Operating System.
17. Write short notes on the following.

(i)Process Control Block

(ii)Critical Section

1. What are deadlock? How deadlocks avoided in operating system. Explain it with suitable example.
2. Draw and explain process state transitions.
3. Explain preemptive and non-preemptive concept with example.
4. Find out the safe sequence for the execution of three processes for following example. Maximum resources R1 = 4, R2 = 4.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Allocation matrix** | | | **Maximum requirement** | | |
|  | **R1** | **R2** |  | **R1** | **R2** |
| P1 | 1 | 0 | P1 | 1 | 1 |
| P2 | 1 | 1 | P2 | 2 | 3 |
| P3 | 1 | 2 | P3 | 2 | 2 |

Calculate the need matrix.

1. Define process. Explain various states of process with process state diagram for five state process model.
2. Consider the following processes where arrival and burst time is as shown below :

|  |  |  |
| --- | --- | --- |
| **Process** | **Burst time** | **Arrival time** |
| P1 | 3 | 0 |
| P2 | 6 | 2 |
| P3 | 4 | 4 |
| P4 | 5 | 6 |
| P5 | 2 | 8 |

**calculate :**

1) Average waiting time

2) Average turn around time

If the processes are scheduled

i) FCFS

ii) Shortest job first (assuming all processes arrive at 0 arrival time for SJF).

1. Explain inter process communication. Explain different IPC problems.
2. Explain process and threads in details.
3. Explain the virtual memory system with suitable diagram.
4. Compare paging and segmentation.
5. Explain design issues for paging system.
6. Explain concept of segmentation.
7. What do you mean by page fault? How OS does overcome this fault?
8. Describe page replacement algorithm for memory management?
9. Explain different techniques used for virtual memory.
10. Explain
11. Swapping
12. Paging
13. Write short notes on:
14. FIFO PR
15. Clock PR
16. Working Set PR
17. WS Clock PR
18. Give similarities and differences between paged and segmented memory management schemes.
19. How virtual memory system is utilized in memory management? Explain in details.
20. Mention different page replacement algorithms and explain any one of them.
21. How operating system utilizes swapping technique in memory management?
22. Explain the virtual memory system with suitable diagram.
23. Consider the following page reference string.
24. 1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 3, 7, 6, 3, 2, 1, 3, 6.

The number of page frames = 3. Calculate the page faults for :

* 1. First in first out
  2. Least recently used.

1. Discuss and compare with example various page replacement policies.
2. What do you mean by page fault? How operating system handles this?
3. Explain the need for paging.
4. What are the advantages and disadvantages of segmentation?
5. Explain different file operations.
6. Explain Input/output software layers.
7. Draw and briefly explain the file structure.
8. Explain memory mapped I/O and direct memory access.
9. Explain power management in computer
10. Explain I/O hardware and I/O software
11. Draw and briefly explain the file structure.
12. Write short note on .

1. File management

2. Disc space management

3. Interface management

4. Power management

1. Explain memory mapped I/O and direct memory access.
2. Write short notes on :
   1. File directories.
   2. Power management in file system.
   3. Disk arm scheduling algorithm.
   4. GUI
   5. Network Terminal
3. Write short notes on :
   1. File system and implementation.
   2. Graphical user interface.
   3. Clock software.
4. Explain Different types of disk scheduling algorithms.