# PRINCIPLES OF PROGRAMMING LANGUAGES

**Branch : T.E. (Computer)**

**(2003 Course)**

Time : 3 Hours Marks : 100

***Instructions*** *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*

*2) Answers to the* ***two*** *sections should be written in* ***separate*** *books.*

*3)* ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

*4) Black figures to the* ***right*** *indicate* ***full*** *marks.*

*5) Assume suitable data if* ***necessary****.*

## SECTION – I

1. a) Specify the characteristics of functional and logical programming paradigms. **6**

   b) Explain properties of structured and non-structured data types. **6**

   c) Write short note on ADT (Abstract Data Type). **4**

   OR

2. a) What are the attributes of good programming language ? What are major applications area and corresponding programming languages. **8**

   b) What is importance of declaration and type checking with respect to data types. **4**

   c) What are different steps involved in translation of source code into executable code of a program written in any programming language. **4**

3. a) Explain following keywords of exception handling with examples. **8**

      1) try

      2) catch

      3) throw

   b) When would you use a pointer as a parameter ? And when would you use a reference as a parameter. Explain advantages and disadvantages of each. **8**

   OR

4. a) What is role of heap in storage management. 4

   b) Write a single program fragment producing different results with respect to following parameter passing methods : 8

      1) call by value

      2) call by reference

      3) call by name

   c) Explain importance of local and non-local variables. 4

5. a) Explain program design by using following selection constructs : 8

      1) Program quality

      2) Reliability

      3) Adaptability

      4) Efficiency

   b) What do you mean by operator ? Explain all types of operators used in 'PASCAL'. 5

   c) With suitable example demonstrate how nested procedures used as efficient program design construct. 5

OR

6. a) Differentiate 'C' and 'PASCAL' with respect to following points : 8

      1) Variable declarations

      2) Data types

      3) Type checking

      4) Loops and conditions.

   b) What are undesirable characteristics of procedural programming paradigms. 5

   c) What are variant records ? Explain how variant records are implemented in 'PASCAL'. 5

## SECTION – II

7. a) Why Java doesn't support for multiple inheritance ? Explain how interfaces plays role for it. **6**

   b) Define Java package. How to create user defined package. Explain with suitable code how to implement package with its compilation and execution. Explain default package. **8**

   c) Explain delegate with syntax and example. **4**

OR

8. a) What is role of net frame work ? Explain: **8**

   1) CLR

   2) CTS

   3) Win forms

   4) Web forms

   Used in -Net

   b) What is mean by 'Applet' ? **6**

   Explain life cycle of Applet with proper example. Why Java. awt package required for supporting Applet program.

   c) Explain assemblies and modules of .Net framework. **4**

9. a) Explain facilities and deficiencies of PROLOG. **4**

   b) With suitable example demonstrate merits and demerits of searching methods used in logic programming. **8**

   c) Elaborate PROLOG 'program structure'. **4**

OR

10. a) Write short notes on following with respect to PROLOG : **8**

    1) Quaries

    2) Facts

    3) Recursive rules

b) Explain applications of logic programming. **4**

c) Elaborate PROLOG 'syntax structure'. **4**

11. a) Define a LISP function to determine whether two given lists are equal. **6**

b) Define following terms with respect to functional programming. **6**

1) Ambiguity

2) Free and bound identifier

3) Reductions

c) Write short note on concurrent programming. **4**

OR

12. a) Explain 'Expression Evaluation' and 'Type checking' in LISP. **8**

b) Explain applications functional programming. **4**

c) Write LISP program for bubble sorting. **4**

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# COMPUTER NETWORKS
## (2003 Course)

Time: 3 Hours Marks: 100

***Instructions :*** *1) Answer **any three** questions from **each** Section.*
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*3) Assume suitable data **if necessary**.*
*4) Draw sketches **wherever** necessary.*
*5) Figures to the **right** indicate **full** marks.*

## SECTION – I

1. a) List and explain in brief eight different applications of computer networks. **8**

   b) What OSI model defines about network devices, transmission media, network transmission and data flow ? **8**

OR

2. a) For store-and-forward packet switching based communication system, the time taken to store and forward a packet through switch along with delays is a governing attribute. If the switching time is 10 microsecond, whether it can be considered as major factor in the response of a client server system where the client is 5000 km away from the server ? Assume the propagation speed in copper and fiber to be 2/3 the speed of light in the vacuum. **8**

   b) Explain two software and two hardware component of computer network. **8**

3. a) How the error control and flow control at data link and transport layer are different from each other ? **8**

   b) What is the default sliding window size used in the Internet ? Explain the logic for varying window size depending on the traffic variations. **8**

OR

4. a) What is the role of Network Interface Card ? Explain the working of Network Interface Card with suitable block diagram. **8**

   b) How design of bridge is different from switch ? What is the difference between normal switch and IP switch ? **8**

5. a) How collision is practically detected in Ethernet networks ? What steps are taken to avoid further collisions ? **8**

   b) "As the DTR of network increases, the length of network cable segment decreases". Is this statement true ? Justify your answer. **10**

OR

6. Write short notes on : **18**

   a) WDMA

   b) Bluetooth

   c) Virtual LAN

## SECTION – II

7. a) What is the difference between classful and classless IP addressing ? Which addressing is currently used in the internet ? Explain with suitable example. **8**

   b) Explain how RIP protocol makes the use of distance vector routing to discover the route. **8**

OR

8. a) What do you mean by quality of service in network services ? Explain it with respect to reliability, delay, jitter and bandwidth. **8**

   b) List the six ways for preventing congestion control. Explain any two of them. **8**

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9. a) List and explain any four transport service primitives. **8**

   b) What do you mean by silly window syndrome problem ? Explain the Clarks and Nagle algorithm to overcome this problem. **8**

OR

10. a) Explain four performance issues related with transport layer. **8**

    b) Why TCP need four different timers ? Explain the functions of retransmission, persistence, keep alive and time-waited timer. **8**

11. a) Describe the two methods given by DNS protocol for searching the host. **10**

    b) List the similarities and differences between POP3 and IMAP. From ISP point of view which protocol would be better and why ? **8**

OR

12. a) What is the need of MIME ? Explain the all field in MIME header. **10**

    b) Explain the working of FTP protocol in detail. **8**

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# MANAGEMENT INFORMATION SYSTEMS
## (2003 Course)

Time: 3 Hours Marks : 100

***Instructions** :1) Answer **three** questions from **each** Section.*
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*3) Assume suitable data **if necessary**.*
*4) Draw sketches **wherever** necessary.*
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SECTION – I

1. A) What is information system ? Classify information systems. Discuss major differences among them. 9

   B) What is manager ? Enlist major functions of manager. How does manager deal with different levels of management ? 8

OR

2. A) How does the use of information technology (IT) support a company's business operations and decision-making ? 9

   B) What are different models of organization structure ? Explain their suitability with business world. 8

3. A) Explain different business processes in hospital management system with suitable example. 9

   B) Why is human resource management (HRM) considered as an important element in information technology (IT) sector ? 8

OR

4. A) Explain the importance of MIS in service industry. 9

   B) What is on-line transaction processing system ? Explain applications in which it can be beneficial. 8

5. A) What is ERP ? Explain different phases of ERP implementation. 8

   B) Is ERP an asset ? Why ? Explain it with suitable examples. 8

OR

6. A) What is BPO ? Which are major business processes outsourced by different industries ? Explain in detail. 8

   B) What is call center ? What are the different activities performed in the call center ? 8

## SECTION – II

7. A) What is CRM ? How can it affect the way companies do their business ? 9

   B) Explain the process of payment making in e-commerce with suitable examples. 8

OR

8. A) What is supply-chain management ? Discuss the role of internet in the process of supply chain management. 9

   B) Explain the functions and outcomes of integrated e-commerce business. 8

9. A) What is DSS ? Differentiate DSS from MIS. 9

   B) Describe tools and models used in implementation of DSS. 8

OR

10. A) Explain knowledge-based expert system with a proper example. 9

    B) What are the advantages and limitations of expert systems ? 8

11. A) What are the health issues involved in use of IT products ? How do we deal with them ? 8

    B) What is global management in IT sector ? 8

OR

12. A) Discuss about various cyber crimes. 8

    B) What is biometric security ? How is it beneficial ? 8

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# SYSTEMS PROGRAMMING
## Branch : T.E. (Computers)
## (2003 Course)

Time : 3 Hours Max. Marks : 100

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*4) Figures to the **right** indicate **full** marks.*
*5) Assume **suitable** data, **if necessary**.*

SECTION – I

1. a) State **True** or **False** :
   i) Re-entrant code is one wherein the instructions are the same each time a program is used.
   ii) Preprocessor is a language processor which bridges an execution gap but is not a language processor.
   iii) An interpreter will not generate machine language.
   iv) The absence of a target program implies the absence of an output interface of the interpreter. **4**

   b) Comment on the following statements :
   i) "All compilers are translators but all translators are not compilers".
   ii) "Macros can not detect instructional errors i.e. errors in opcodes". **4**

   c) Which macro features required to have a stack and need recursion ? Explain in brief. **4**

   d) Compare : Marco with function. **4**

OR

2. a) What is the literal ? What is its advantage in assembly language programming ? **4**

   b) How are the literals handled in an assembler ? Show all the data structures required for processing of literals. Give appropriate examples. **8**

c) With respect to the design of a Two Pass assembler, state whether th statements are **True** or **False**. Justify your answer in each case :

i) Literals are processed in PASS-II

4 ii) Undefined symbols are detected in PASS-I.

6 3. a) What is loader ? Enlist the basic functions of a loader.

8 b) Write a note on MS-DOS Linker.

2 c) What is linker ?

OR

4. a) Answer the following with respect to Two Pass direct linking loader :

i) What is the function of PASS-I ?

ii) What is the function of PASS-II ?

iii) Suppose you were to restrict to one pass loader, what facilities w you be able to give to the user (Viz : simple address relocation, external

8 symbol etc).

b) Give an example of each of the following types of address constants :

i) Simple re-locatable

ii) Absolute

6 iii) Complex re-locatable.

2 c) What is an overlay structure ?

2 5. a) What is a fundamental difference between top down and bottom up parser ?

8 b) Briefly explain recursive descent parsers.

8 c) Explain in brief bottom up parsing scheme.

OR

6. a) State **True** or **False** :

i) Top Down parsing is also called as recursive descent parsing.

ii) Predictive parsing and bottom up parsing are one and the same.

iii) LL parser is a type of predictive parsing.

4 iv) The output of lexical analyzer is given to the parser.

b) Explain the purpose of various phases of compiler. Clearly mention the required input and output generated by each of these phases. **10**

c) Define :

i) Bootstrap compiler ii) Cross-compiler. **4**

## SECTION – II

7. a) What is an operating system ? What are the basic functions of an operating system ? **8**

b) State **True** or **False** :

i) Time sharing operating system allows number of users to execute their programs on the same machine by sharing time among the users.

ii) MS DOS is ingle user operating system.

iii) Multiprogramming increases the CPU utilization.

iv) Multiprocessing is a feature of operating system where many processors area are used and controlled by one operating system. **4**

c) What are system calls ? What are the benefits of using system calls ? **4**

OR

8. a) Define the essential properties of the following operating systems :

i) Batch ii) Time sharing iii) Real time. **6**

b) Consider the following set of jobs :

| Job | Run Time |
|---|---|
| A | 2 hrs |
| B | 1 hr |
| C | 1 hr |
| D | 2 hr |
| E | 1 hr |

Calculate finish time and turn around time of these jobs using the following methods :

i) First Come First Serve

ii) Shortest Job First

iii) Round Robin

Assume all jobs have an arrival time of 10.00. **10**

9. a) Given the memory partitions of size 100k, 500k, 200k, 300k and 600k (in order), how would each of the First-Fit, Best-Fit and Worst-Fit algorithms place the process of 212k, 417k, 112k and 426k (in-order) ? Which algorithm makes the most efficient use of memory ? **10**

   b) Why are segmentation and paging sometimes combined into one scheme ? **6**

OR

10. a) State **True** or **False** :

   i) In a system which uses mono programming without swapping or paging, only one process can be running at a given time.

   ii) Paging technique is used in virtual memory systems. **2**

   b) What do you mean by page fault ? How the operating system handles this ? **4**

   c) What is the difference between physical address and a virtual address ? **4**

   d) Compare segmentation and paging. **6**

11. a) A disk has 640 cylinders numbered 0-639. The drive is currently serving the request 68. The queue of pending requests in FIFO order is :

   84, 154, 32, 128, 10, 133, 61, 69

   Start from the current head position. What is the total difference that disk arm moves to satisfy all the pending request for the following disk scheduling algorithms :

   i) FCFS

   ii) C-SCAN. **10**

   b) Describe any four types of file organization. **8**

OR

12. Write short notes on (**any three**) : **18**

   a) Record Blocking

   b) I/O Buffering

   c) Disk Performance Parameters

   d) Free disk space management techniques.

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# SOFTWARE ENGINEERING
## (2003 Course)

Time : 3 Hours Max. Marks : 100

***Instructions:*** *1) Answers to the **two** Section should be written in **separate** book.*
*2) Black Figures to the **right** indicate **full** marks.*
*3) From Section **I**, Answer (Q. 1 or Q. 2) and (Q. 3 or Q. 4) and (Q. 5 or Q. 6).*
*4) From Section **II**, Answer (Q. 7 or Q. 8) and (Q. 9 or (Q. 10) and (Q. 11 or Q. 12).*
*5) Neat diagrams must be drawn **wherever** necessary.*

SECTION – I

1. A) What are the characteristics of Software ? What are the elements of Waterfall Process Model ? What are the demerits of Waterfall Model ? **8**

   B) What is the purpose of CMMI ? List and explain Generic goals and practices for Project Planning process area. **9**

OR

2. A) List and explain Practitioner's myths. What is the importance of documentation in successful solution development and maintenance ? **8**

   B) What are the elements of Prototyping process model ? What are the merits and demerits of Prototyping process model ? **9**

3. A) What is the importance of Communication Practices ? What are the principles of Communication Practices ? **8**

   B) What is importance of Testing Practices ? What are the principles of Testing Practices ? **9**

OR

4. A) What is the importance of Modeling Practices ? What are the principles of Modeling Practices ? **8**

   B) What restraining factors an engineer should consider while constructing system model ? What is the relationship between Domain View and Element View in System Hierarchy ? **9**

5. A) Why Requirement Elicitation is difficult ? What is meant by Requirement Negotiation ? Why Requirements need to stable and correct ? **8**

   B) What are Use Cases ? What is the relation between Requirements and Use Cases ? What questions should be answered while developing Use Cases ? **8**

OR

6. A) What is the purpose of Requirement Validation ? What are the elements of Requirement Management ? 8

B) What are the elements of Data Flow model ? What is Control Specification ? What is process specification ? 8

## SECTION – II

7. A) What are the guidelines for achieving Design Quality ? What is Abstraction ? What is the importance of Modularity ? 8

B) What is Design Pattern ? How Patterns can be used in Design ? What is meant by Frameworks ? 9

OR

8. A) What is Information Hiding ? What is Stepwise Refinement ? What is Refactoring ? 8

B) Explain in detail following Architectural Styles : 9

a) Data-Centered Architecture

b) Data-Flow Architecture

c) Call and Return Architecture.

9. A) What is the difference between Testing and Debugging ? How Software Testing is organized ? What is Unit Testing ? 8

B) What are the objectives of Black-Box Testing ? What is Graph-Based Testing method ? What are the merits of Black-Box Testing ? 9

OR

10. A) How Completion of Testing is identified ? What is Regression Testing ? What are the benefits of Regression Testing ? 8

B) What are the elements of Flow-Graph ? What is the significance of Cyclomatic Complexity ? With a suitable example, explain Loop Testing. 9

11. A) What is the importance of Software Quality ? List and explain McCall's Quality Factors. 8

B) Explain in detail Metrics for Specification Quality. 8

OR

12. A) What is the difference between Measure and Metric ? What are the principles for Measurement and Metrics characterization and validation ? 8

B) Explain in detail Architectural Design Metrics. 8