RESEARCH METHODOLOGY

1. What is research primarily aimed at ?

(a) Creating knowledge

(b) Gathering opinions

(c) Writing reports

(d) Publishing articles

2. Which of the following is *not* a characteristic of research ?

(a) Systematic (b) Objective

(c) Random (d) Empirical

3. What type of research explores new ideas ?

(a) Descriptive (b) Causal

(c) Exploratory (d) Historical

4. In research, the variables are :

(a) Unchanging factors (b) Elements that can change

(c) Outcomes of studies (d) None of these

5. What is the purpose of a literature review ?

(a) To collect data

(b) To write articles

(c) To conduct experiments

(d) To summarize existing knowledge

6. Which research design describes characteristics of a population ?

(a) Causal

(b) Descriptive

(c) Experimental

(d) Exploratory

7. Which sampling method ensures every member has an equal chance of being selected ?

(a) Random sampling

(b) Stratified sampling

(c) Convenience sampling

(d) Quota sampling

8. Qualitative research primarily focuses on :

(a) Numbers

(b) Meanings

(c) Experiments

(d) Statistical analysis

9. What does intellectual honesty in research involve ?

(a) Ignoring conflicts of interest

(b) Falsifying data

(c) Accurate reporting of findings

(d) Plagiarism

10. What is plagiarism ?

(a) Incorrect citation

(b) Using someone else's work without credit

(c) Misreporting data

(d) None of the above

11. Which format is commonly used for referencing in the social sciences ?

(a) APA   (b) MLA

(c) Chicago   (d) Harvard

12. What is the impact factor ?

(a) A measure of research quality

(b) A type of statistical analysis

(c) A research methodology

(d) A publication process

13. Conflicts of interest should be :

(a) Ignored   (b) Disclosed

(c) Celebrated   (d) Hidden

14. What is the purpose of ethics in research ?

(a) To enhance publicity   (b) To increase funding

(c) To ensure fair practices   (d) None of these

15. Which of the following is a primary data source ?

(a) Online articles

(b) Surveys conducted by the researcher

(c) Literature reviews

(d) Historical records

16. What does a research proposal outline ?

(a) The final results   (b) The publication strategy

(c) The funding sources   (d) The research plan

17. What is the significance of a hypothesis in research ?

(a) It provides a conclusion

(b) It offers a tentative explanation

(c) It summarizes the research

(d) It defines the methodology

18. Which method is most likely to introduce bias in research ?

(a) Random sampling   (b) Stratified sampling

(c) Convenience sampling   (d) Systematic sampling

19. In hypothesis testing, a type I error occurs when :

(a) the null hypothesis is rejected when it is true

(b) the null hypothesis is accepted when it is false

(c) data is misinterpreted

(d) a sample is biased

20. Which type of sampling involves dividing the population into subgroups ?

(a) Random sampling   (b) Stratified sampling

(c) Cluster sampling   (d) Systematic sampling

21. Which research design involves repeated observations over time ?

(a) Cross-sectional   (b) Experimental

(c) Longitudinal   (d) Descriptive

22. What is the primary role of concepts in theory development ?

(a) To provide statistical measures

(b) To form the foundation of hypotheses

(c) To manipulate variables

(d) To summarize findings

23. What is the purpose of peer review ?

(a) To promote research

(b) To validate research quality

(c) To increase publication rates

(d) None of the above

24. In the context of research, what does FFP stand for ?

(a) Findings, Framework, Propositions

(b) Falsification, Fabrication, Plagiarism

(c) Facts, Figures, Proposals

(d) None of the above

25. What is the main advantage of using ICT in research ?

(a) Improved communication

(b) Enhanced data collection

(c) Greater accessibility to resources

(d) All of the above

26. Which research design is best for historical studies ?

(a) Descriptive

(b) Experimental

(c) Longitudinal

(d) Historical

27. What does the term "impact factor" measure ?

(a) The quality of research

(b) The citation frequency of journals

(c) The number of authors

(d) The funding received

28. What is a common challenge of secondary data analysis ?

(a) Lack of data

(b) Data relevance and accuracy

(c) Data collection methods

(d) None of these

29. What does a control variable do in an experiment ?

(a) Introduces bias

(b) Influences the outcome

(c) Remains constant to isolate effects

(d) Alters the hypothesis

30. Which of the following represents a methodological approach to studying behavior over time ?

(a) Cross-sectional study

(b) Longitudinal study

(c) Experimental study

(d) Case study

31. What is the term for the manipulation of data to fit a desired outcome ?

(a) Falsification

(b) Fabrication

(c) Misrepresentation

(d) Citation error

32. What is the main purpose of citation in research ?

(a) To reduce plagiarism

(b) To summarize findings

(c) To confuse readers

(d) To support arguments and provide sources

33. Which of the following is *not* a method for ensuring research integrity ?

(a) Peer review

(b) Data fabrication

(c) Transparent reporting

(d) Open-access publishing

34. What is a key factor in selecting a research method ?

(a) Personal preference

(b) Availability of funding

(c) Research objectives

(d) None of the above

35. What is the purpose of a pilot study ?

(a) To test feasibility and methodology

(b) To collect final data

(c) To publish results

(d) To conduct a comprehensive review

36. What does reliability refer to in research ?

   (a) The accuracy of the results

   (b) The consistency of measurement

   (c) The validity of the findings

   (d) The ethical standards applied

37. Which of the following represents an ethical principle in research involving human subjects ?

   (a) Confidentiality   (b) Coercion

   (c) Misinformation   (d) Data fabrication

38. Which of the following is essential for ensuring the validity of research findings ?

   (a) Randomization   (b) Sample size

   (c) Methodological rigor   (d) All of these

39. What does a researcher's conflicts of interest typically involve ?

   (a) Personal relationships that could bias results

   (b) Financial interests related to the research

   (c) Both (a) and (b)

   (d) None of the above

40. What does triangulation in research refer to ?

   (a) Using multiple methods or sources to study a phenomenon

   (b) Relying on a single method for data collection

   (c) Testing a hypothesis

   (d) Conducting a meta-analysis

41. In research ethics, informed consent refers to :

(a) Collecting data without participant knowledge

(b) Participants being aware of the study's purpose

(c) Ensuring funding is available

(d) None of the above

42. Which type of research is best for understanding cultural phenomena ?

(a) Experimental   (b) Quantitative

(c) Ethnographic   (d) Longitudinal

43. What is the purpose of stratified sampling ?

(a) To select participants randomly

(b) To ensure representation of subgroups

(c) To simplify data collection

(d) To reduce bias

44. What does a citation database provide ?

(a) Original research articles

(b) References for academic writing

(c) Funding sources for research

(d) Experimental data

45. What is the main goal of publication ethics ?

(a) To promote fair practices in publishing

(b) To increase the number of publications

(c) To reduce the time to publication

(d) None of the above

46. Quantitative research is characterized by :

    (a) Subjective analysis   (b) Objective measurement

    (c) Case studies   (d) Thematic analysis

47. Which of the following databases is used for indexing research articles ?

    (a) Google Scholar   (b) JSTOR

    (c) PubMed   (d) All of these

48. Which of the following is a key component of a reference entry ?

    (a) Author's name   (b) Year of publication

    (c) Title of the work   (d) All of these

49. Open-access publishing allows :

    (a) Restricted access to articles

    (b) Free access to published research

    (c) Only paid subscriptions

    (d) Limited distribution

50. In hypothesis testing, a null hypothesis typically states :

    (a) No effect or no difference

    (b) There is a relationship

    (c) Data is unreliable

    (d) The study is biased

COMPUTER SCIENCE & ENGINEERING

51. Which of the following is an example of a tautology ?

(a) p AND $\sim p$ (b) p OR $\sim p$

(c) p XOR $\sim p$ (d) $p \leftrightarrow \sim p$

52. Which property is *not* necessarily satisfied by an equivalence relation ?

(a) Reflexivity   (b) Symmetry

(c) Transitivity   (d) Asymmetry

53. What is the chromatic number of a graph ?

(a) The minimum number of colors needed to color the vertices of the graph such that no two adjacent vertices have the same color.

(b) The maximum degree of any vertex in the graph.

(c) The minimum degree of any vertex in the graph.

(d) The maximum number of vertices that are pairwise adjacent.

54. If $C = A \cap B$, what is the complement of set C with respect to the universal set U ?

(a) $A \cap B$ (b) $A \cup B$

(c) $A - B$ (d) $A' \cup B'$

55. Which of the following distributions is characterized by a constant hazard rate ?

(a) Normal distribution

(b) Exponential distribution

(c) Poisson distribution

(d) Binomial distribution

56. If a data set is symmetric, then which of the following is *true* ?

(a) Mean < Median < Mode

(b) Mean > Median > Mode

(c) Mean = Median = Mode

(d) Median > Mode > Mean

57. What is the number of ways to arrange n distinct objects in a sequence ?

(a) $n!$

(b) 2^n

(c) n^2

(d) $(n + 1)\,!$

58. If the probability of event A is 0.5 and the probability of event B is 0.3 and events A and B are independent, what is $P((A \cap B))$?

(a) 0.8

(b) 0.2

(c) 0.15

(d) 0.5

59. If $f(x) = 3x^2 - 12x + 7$, the critical points occur at :

(a) $x = -2$

(b) $x = 2$

(c) $x = 0$

(d) $x = 4$

60. Which of the following is the correct formula for Bayes' Theorem ?

(a) $P(A/B) = P(A) \cdot P(B/A)$

(b) $P(A/B) = \dfrac{P(B/A) \cdot P(A)}{P(B)}$

(c) $P(A/B) = \dfrac{P(A) \cdot P(B)}{P(B/A)}$

(d) $P(A/B) = P(A) + P(B/A)$.

61. Which of the following is the result of the expression $A \wedge \neg A$?

(a) A   (b) 1

(c) 0   (d) $\neg A$

62. Which of the following represents the floating-point format ?

(a) sign $\times$ mantissa $\times$ base$^{\text{exponent}}$

(b) sign $+$ mantissa $+$ base

(c) sign $\div$ mantissa $\times$ exponent

(d) sign $+$ base$^{\text{exponent}}$

63. What is the main benefit of instruction pipelining ?

(a) Reduced instruction set

(b) Increased CPU clock speed

(c) Increased throughput of instruction execution

(d) Simpler control unit design

64. Which of the following is the fastest type of memory in the memory hierarchy ?

(a) Secondary storage

(b) Main memory (RAM)

(c) Cache memory

(d) Registers

65. In an interrupt-driven I/O operation, what does the CPU do when an interrupt occurs ?

(a) Stops all processes immediately

(b) Completes the current instruction and then handles the interrupt

(c) Ignores the interrupt

(d) Switches to DMA mode

66. What is the role of the control unit in a CPU ?

(a) To execute arithmetic operations

(b) To decode instructions and control data flow

(c) To store data

(d) To manage input/output devices

67. Which property is *true* for a binary search tree (BST) ?

(a) Left child is greater than the parent.

(b) Right child is less than the parent.

(c) Left child is less than the parent and right child is greater.

(d) All nodes must have two children.

68. What is the primary advantage of a linked list over an array ?

(a) Faster access to elements

(b) Dynamic size and ease of insertion/deletion

(c) Simplicity of implementation

(d) Requires less memory

69. What is the time complexity of accessing an element in an array ?

(a) $O(n)$ (b) $O(\log n)$

(c) $O(1)$ (d) $O(n^2)$

70. What is the correct way to declare a pointer to an integer in C ?

(a) int *ptr   (b) ptr int

(c) int & ptr   (d) int ptr*

71. Which of the following traversal methods uses a queue data structure ?

(a) Depth-first search (DFS)

(b) Breadth-first search (BFS)

(c) Dijkstra's algorithm

(d) Prim's algorithm

72. Which of the following problems can be solved using a greedy algorithm ?

(a) Knapsack problem

(b) Traveling salesman problem

(c) Minimum spanning tree

(d) Longest common subsequence

73. What is the main advantage of using a hash table ?

(a) It sorts data efficiently.

(b) It provides constant time complexity for search operations on average.

(c) It minimizes memory usage.

(d) It guarantees unique elements.

74. Which sorting algorithm has the best average-case time complexity ?

(a) Bubble Sort   (b) Selection Sort

(c) Quick Sort   (d) Insertion Sort

75. What is a characteristic of dynamic programming ?

(a) It always guarantees the optimal solution.

(b) It solves problems by breaking them into subproblems and solving each subproblem only once.

(c) It uses a top-down approach.

(d) It is a type of greedy algorithm.

76. Which of the following statements is *true* regarding context-free languages ?

(a) The intersection of two context-free languages is always context-free.

(b) The union of two context-free languages is context-free.

(c) Context-free languages are closed under complementation.

(d) The concatenation of two context-free languages is not context-free.

77. Which of the following problems is known to be undecidable ?

(a) Determining if a regular expression matches a string

(b) The Halting Problem

(c) Testing for palindrome strings

(d) Sorting a list of numbers

78. What is the main feature of a Turing machine ?

(a) It has a finite number of states.

(b) It can read and write on an infinite tape.

(c) It can only recognize regular languages.

(d) It operates without any memory.

79. The pumping lemma is used to prove that a language is :

(a) Regular

(b) Context-free

(c) Infinite

(d) Not regular

80. Which of the following describes a finite automaton ?

(a) It has an infinite number of states.

(b) It can recognize context-free languages.

(c) It has a finite number of states and transitions.

(d) It can only process regular expressions.

81. What does common subexpression elimination optimize ?

(a) Memory usage

(b) The number of function calls

(c) The number of calculations by reusing previously computed values

(d) The execution time of loops

82. Which of the following is an example of a local optimization ?

(a) Loop unrolling

(b) Dead code elimination

(c) Constant propagation

(d) Function inlining

83. What is the purpose of intermediate code generation in a compiler ?

(a) To optimize the final machine code

(b) To provide a platform-independent representation of the source code

(c) To perform lexical analysis

(d) To parse the source code

84. Which of the following parsing techniques is top-down ?

(a) LR Parsing (b) LL Parsing

(c) SLR Parsing (d) LALR Parsing

85. What is the primary function of a lexical analyzer ?

(a) To check for syntax errors.

(b) To convert source code into tokens.

(c) To generate machine code.

(d) To optimize the code.

86. Which scheduling algorithm is designed to minimize the average waiting time for processes ?

(a) First-Come, First-Served (FCFS)

(b) Round Robin (RR)

(c) Shortest Job Next (SJN)

(d) Priority Scheduling

87. Which condition is *not* a necessary condition for a deadlock to occur ?

(a) Mutual Exclusion (b) Hold and Wait

(c) Preemption (d) Circular Wait

88. Which of the following is a method of inter-process communication (IPC) ?

(a) Mutex

(b) Semaphore

(c) Pipes

(d) All of these

89. What is the primary purpose of a system call ?

(a) To initiate hardware interrupts.

(b) To request services from the operating system kernel.

(c) To execute user-level processes.

(d) To manage memory allocation.

90. Which of the following is *true* about threads in a process ?

(a) Each thread has its own memory space.

(b) Threads within the same process share the same memory space.

(c) Threads cannot communicate with each other.

(d) Creating a thread is more expensive than creating a process.

91. What is the main advantage of using B+ trees over B trees ?

(a) B+ trees store all records in the leaf nodes, making range queries more efficient.

(b) B trees require more memory.

(c) B+ trees can have fewer children per node.

(d) B trees do not allow duplicate keys.

92. Which of the following is an example of an integrity constraint ?

(a) Foreign key constraint

(b) Primary key constraint

(c) Check constraint

(d) All of the above

93. Which of the following is *not* a basic operation in relational algebra ?

(a) Selection   (b) Projection

(c) Deletion   (d) Union

94. What is the primary function of ARP (Address Resolution Protocol) ?

(a) To translate domain names to IP addresses

(b) To resolve IP addresses to MAC addresses

(c) To provide routing information

(d) To handle e-Mail delivery

95. What does CIDR stand for in IP addressing ?

(a) Classless Inter-Domain Routing

(b) Constant Internet Data Routing

(c) Circuit Identifier Data Records

(d) Central Internet Domain Routing

96. Which routing protocol uses the Bellman-Ford algorithm ?

(a) OSPF

(b) BGP

(c) RIP

(d) EIGRP

97. What is the main purpose of Medium Access Control (MAC) in the data link layer ?

(a) To control data flow between devices

(b) To manage how devices share a communication channel

(c) To detect errors in transmitted frames

(d) To establish connections between devices

98. In packet switching, what happens to data when it is transmitted ?

(a) It is sent as a continuous stream.

(b) It is divided into packets that may take different paths.

(c) It is sent only through the shortest path.

(d) It is only transmitted once a dedicated circuit is established.

99. Which layer of the OSI model is responsible for end-to-end communication and error recovery ?

(a) Network Layer

(b) Transport Layer

(c) Data Link Layer

(d) Application Layer

100. Which of the following techniques is used for error detection in the data link layer ?

(a) Parity check

(b) Frame relay

(c) Token ring

(d) Carrier Sense Multiple Access