

QB365 Question Bank Software Study Materials

Iteration and recursion 45 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Computer Science

Total Marks : 45

Multiple Choice Question

45 x 1 = 45

- 1) A loop invariant need not be true
(a) at the start of the loop (b) at the start of each iteration (c) at the end of each iteration
(d) at the start of the algorithm
- 2) We wish to cover a chessboard with dominoes, $\square\square$ the number of black squares and the number of white squares covered by dominoes, respectively, placing a domino can be modeled by
(a) $b := b + 2$ (b) $w := w + 2$ (c) $b, w := b + 1, w + 1$ **(d) $b := w$**
- 3) If $m \times a + n \times b$ is an invariant for the assignment $a, b := a + 8, b + 7$, the values of m and n are
(a) $m = 8, n = 7$ **(b) $m = 7, n = -8$** (c) $m = 7, n = 8$ (d) $m = 8, n = -7$
- 4) Which of the following is not an invariant of the assignment? $m, n := m+2, n+3$
(a) $m \bmod 2$ (b) $n \bmod 3$ (c) $3 \times m - 2 \times n$ **(d) $2 \times m - 3 \times n$**
- 5) If Fibonacci number is defined recursively as
$$F(n) = \begin{cases} 0 & n = 0 \\ 1 & n = 1 \\ F(n-1) + F(n-2) & \text{otherwise} \end{cases}$$
to evaluate $F(4)$, how many times $F()$ is applied?
(a) 3 (b) 4 (c) 8 (d) 9
- 6) Using this recursive definition
$$a^n = \begin{cases} 1 & \text{if } n = 0 \\ a \times a^{n-1} & \text{otherwise} \end{cases}$$
how many multiplications are needed to calculate a^{10} ?
(a) 11 (b) 10 **(c) 9** (d) 8
- 7) Which of the following algorithm design techniques to execute the same action repeatedly?
(a) Assignment (b) Iteration (c) Recursion **(d) Both b and c**
- 8) Which statements executed repeatedly as long as the loop condition is true?
(a) Sequential (b) Abstraction **(c) Iteration** (d) Assignment
- 9) Which of the following is updated when each time the loop body is executed?
(a) Data **(b) Variables** (c) Function (d) All of these
- 10) The unchanged variables of the loop body is called loop _____.
(a) condition (b) loop statement (c) loop variable **(d) loop invariant**
- 11) Which of the following is the key to construct iterative algorithms?
(a) loop invariant (b) loop updation (c) loop variable (d) lop condition
- 12) Which of the following is more powerful algorithms design technique closely related to iteration?
(a) Specification (b) Abstraction **(c) Recursion** (d) Decomposition

- 13) How many cases are there a recursive solver has_____.
- (a) **2** (b) 3 (c) 4 (d) many
- 14) Which of the following is a recursive solver case?
- (a) Base case (b) Recursive case (c) loop case (d) **Both a and b**
- 15) How many important points the loop variant is true?
- (a) 1 (b) 2 (c) 3 (d) **4**
- 16) How many base case at least must be in recursion?
- (a) **1** (b) 2 (c) 4 (d) 3
- 17) _____is an algorithm design technique, closely related to induction.
- (a) Iteration (b) Invariant (c) Loop invariant (d) **Recursion**
- 18) In which year E W Dijkstra was awarded ACM Turing Award?
- (a) **1972** (b) 1974 (c) 1970 (d) 1971
- 19) In a loop, if L is an invariant of the loop body B, then L is known as a _____
- (a) recursion (b) variant (c) **loop invariant** (d) algorithm
- 20) Which one is odd?
- (a) at the start of the loop (just before the loop) (b) at the start of each iteration (before loop body)
- (c) at the end of each iteration (after loop body) (d) **at the middle of the loop (just before the loop)**
- 21) If L is a loop variant, then it should be true at _____ important points in the algorithm.
- (a) 2 (b) 3 (c) **4** (d) 5
- 22) The loop invariant need not be true at the _____.
- (a) Start of the loop (b) end of the loop (c) end of each iteration (d) **middle of algorithm**
- 23) In an expression if the variables has the same value before and after an assignment, then it is _____of an assignment.
- (a) variant (b) **Invariant** (c) iteration (d) variable
- 24) The input size to a sub problem is _____ than the input size to the original problem.
- (a) equal (b) **smaller** (c) greater (d) no criteria
- 25) How many cases are needed for a recursive solvers?
- (a) **2** (b) 3 (c) 4 (d) 5
- 26) What will be the state condition, if the process progresses to achieve the desired input-output relation with respect to same action repeatedly?
- (a) State increases (b) Invariant state (c) State decreases (d) **State changes**
- 27) Even though the action is same, the state in which the action is executed is _____.
- (a) same (b) **not same** (c) repeatedly (d) none of these
- 28) Which of the following option is closely related to iteration?
- (a) **Recursion** (b) Loop variant (c) Loop invariant (d) Invariant Assignment
- 29) Which of the following is unchanging property?

- (a) Loop variant (b) Loop invariant **(c) Invariant operator** (d) None of these
- 30) Which of the following is more powerful?
 (a) Pseudocode (b) Programming code (c) Invariant assignment **(d) Recursion**
- 31) When the assignment has not changed its value, it is called _____.
 (a) invariant value **(b) invariant assignment** (c) invariant operation (d) none of these
- 32) **Assertion:** If an expression of the variables has the same value before and after an assignment, it is an invariant of the assignment.
Reason: The assignment has not changed the value of $u + v$ -- before: $u, v = 20, 15$ $u, v := u + 5, v - 5$ -- after: $u, v = 25, 10$.
(a) Both assertion and reason are true and R is the correct explanation of assertion
 (b) Both assertion and reason are true but reason is not the correct explanation of assertion
 (c) Assertion is false but reason is true (d) Both assertion and reason are false
- 33) What will be the condition for the loop invariant before and after the loop body, each time?
 (a) Not same **(b) True** (c) False (d) Different
- 34) What is the output of P in the loop invariant if $P = a^i$, but $i = 5$?
 (a) $p = a^i + 5$ (b) $p = a^i - 5$ (c) $p = a^{5i}$ **(d) $p = a^5$**
- 35) At the start of loop invariant $P - C = K$ is True and if $P - C = 1$, what is the value of K.
(a) $K = 1$ (b) $K = 2$ (c) $K = 0$ (d) 3
- 36) Which of the following is incorrect?
 (a) Each solver receives an input. (b) Passes an input of reduced size to a sub-solver.
(c) Receives the solution to central processes unit.
 (d) Receives the solution to the reduced input from the sub-solver, and produces the solution for the given input.
- 37) Which of the following incorrect to construct a loop?
 (a) Establish the loop invariant at the start of the loop.
 (b) The loop body should so update the variables as to process toward the end and maintain the loop invariant at the same time.
(c) When the loop ends, iteration processes establish.
 (d) When the loop ends, the termination condition and the loop invariant should establish the input-output relation
- 38) In which technique, we can solve a problem with a given input, by solving the instances of the problem With a part of the input _____.
 (a) Iteration **(b) Recursion** (c) Invariant (d) Algorithm
- 39) Iteration repeats the _____ steps of evaluating a condition and executing a statement, as long as the condition is true.
 (a) same (b) different **(c) two** (d) none of these
- 40) An invariant for the loop body is known as a _____.
 (a) loop (b) invariant body (c) loop body **(d) loop invariant**

41) **Match the following**

(a) Variables	(i) Closely related to induction
(b) Recursion	(ii) Solver calls sub-solver
(c) Iteration	(iii) Repeats as long as condition is true
(d) Recursive call	(iv) updates each time

(a)
i)ii)iii)iv)
4 1 2 3

(b)
i)ii)iii)iv)
2 3 1 4

(c)
i)ii)iii)iv)
4 1 3 2

(d)
i)ii)iii)iv)
4 3 2 1

42) **Assertion (R):** At the start and end of the loop, at the start and end of each iteration, if loop invariant is before.

Reason (R): An in-variant for the loop body is known as loop invariant.

(a) Both assertion and reason are true and R is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is false but reason is true (d) Both assertion and reason are false

43) **Assertion (R):** when the loop ends, the termination condition and loop invariant should establish the input-output relation.

Reason (R): Recursion breaks the problem into sub-problem of smaller size and constructs the solution to given problem.

(a) Both assertion and reason are true and R is the correct explanation of assertion

(b) Both assertion and reason are true but reason is not the correct explanation of assertion

(c) Assertion is false but reason is true (d) Both assertion and reason are false

44) _____ is the algorithm design techniques to execute the same action repeatedly.

(a) Iteration (b) Recursion **(c) Both a & b** (d) none of these

45) Which is the key to construct iterative algorithms _____.

(a) loop invariant (b) Variable (c) loop (d) Recursive