**Q1.** What will be the output of the following pseudocode?

Integer i

Set i = 3

do

print i + 3

i = i - 1

while(i not equals 0)

end while

[Note: A do while loop is a control flow statement that executes a block of code at least once, and then repeatedly executes the given Boolean condition at the end of the block]

**A)** 6 6 6

**B)** 6 5 6

**C)** 5 5 5

**D)** 6 5 4

**Ans:**D

**Explanation:**

In this program, one variable declared as i, and value initialized as 3. We are moving with do-

1. while(Do while will execute the statement once and then it will check the condition).
2. Step 1:
3. It will print i+3, here i value is 3. So i+3 is 6. On the next line, i will be decremented by 1. Then checking the conditions in do-while() i!=0. Here updated i value is 2 (2!=0),so condition is true. The loop continues.
4. Step 2:
5. It will print i+3, here updated i value is 2. So i+3 is 5. On the next line i will be decremented by 1. Then checking the conditions in do-while() i!=0. Here updated i value is 1 (1!=0),so condition gets true. The loop continues
6. Step 3:
7. It will print i+3, here updated i value is 1. So i+3 is 4. On the next line i will be decremented by 1. Then checking the condition in do while() i!=0. Here updated i value is 0 (0!=0),so condition gets false. Thus the loop gets terminated!

10. **E.g. code to explain this:**
11. *Do while* will execute the statement for the first time and then it will check the condition.
13. int i=3;
14. do{
15. cout<<i+3;   => 3+3 =6  =>2+3 =>5  =>1+3=4
16. i=i-1;             => 3-1=2    =>2-1 =>1   =>1-1=0
17. }while(i!=0);

**Q2. What would be the output of the following pseudocode?**

1. Integer a
2. String str1
3. Set str1 = “goose”
4. a = stringLength(str1)
5. Print (a ^ 1)
6. [Note- string-length(): string-length() function counts the number of characters in a given string and return the integer value.
7. ^ is the bitwise exclusive OR operator that compares each bit of its first operand to the corresponding bit of its equal operand. If one bit is 0 and the other bit is 1, the corresponding result bit is set to 1. Otherwise, the corresponding result bit is set to 0]
8. **A)** 0
9. **B)** 4
10. **C)** 5
11. **D)** 3
13. **Ans:**B
15. **Explanation:**
16. There are two variables **a** and **str1.**Value initialized for str1 is “goose”. On the next line, we are finding the length of str1 that is 5. Finally, printing the output of a bitwise exclusive OR operator with 1. And the answer is 4.

19. **E.g. code to explain this:**
20. {
21. int a;
22. string str1="goose";
23. a = str1.length(); => length of String is 5
24. cout<<(a^1);             5 xor 1 => 4
25. }
27. **Q3.** What would be the output of the following pseudocode?
28. Integer a, b, c
29. Set a = 8, b = 51, c = 2
30. c = (a ^ c)^ (a)
31. b = b mod 4
32. Print a + b + c

[Note- mod finds the remainder after the division of one number by another. For example, the expression “5 mod 2” would evaluate to 1 because 5 divided by 2 leaves a quotient of 2 and a remainder of 1

1. ^ is the bitwise exclusive OR operator that compares each bit of its first operand to the corresponding bit of its equal operand. If one bit is 0 and the other bit is 1, the corresponding result bit is set to 1. Otherwise, the corresponding result bit is set to 0]
2. A. 13
3. B. 17
4. C. 26
5. D. 16
6. **Ans**:A
7. **Explanation:**
8. There are three variables a, b and c declared. Value initialized for a is 8, b is 51 and c is 2.
9. When we do a bitwise exclusive OR of (8^2), the answer is 10. Again 10 bitwise exclusive OR of a i.e (10 ^ 8) is 2, which will be stored in variable c.
10. Then taking ***modulo*** operation for b by 4 (b%4) the answer is 3
11. Finally adding all the updated values of a,b, and c (8+2+3 ) and the output of Pseudocode is 13.
13. **E.g. code to explain this:**
15. int main()
16. {
17. int a=8,b=51,c=2;
18. c = (a ^ c)^ (a); =>(8^2) ^(8) => 10 ^ 8 => 2
19. b = b % 4;        =>3
20. cout<<a + b + c; =>8+2+3 => 13
21. }
22. Note: ^ is the bitwise exclusive OR


26. **Q4.** Consider an array A = {1, 2, 4, 5, 6, 11, 12} and a key which is equal to 10. How many comparisons would be done to find the key element in the array using the binary search?
27. A.     5
28. B.     1
29. C.     2
30. D.     3
31. **Ans:**D
32. **Explanation:**
33. There is an Integer Array A = {1, 2, 4, 5, 6, 11, 12} and the key value is 10.
34. **Binary search applies only sorted, ordered list.**
35. We know that binary search takes log n base 2 time to search for a particular element.
36. If there are N elements in the set you have chosen binary search then take log n base 2 time.
37. 1)First, you check how many elements in your array. if an element in your array is greater than **1 then you**go for the next step.
38. 2)Binary search divides the problem into two parts using the mean of the total number of an element which is sorted **mean=(0+n)/2**
39. 3)And compare the searching element which is either greater the mean or lesser or equal to the mean .then after comparison skip the one part either greater part or small part depends on the result or searching is done if the mean is equal to the searching element. So that problem is divide into **n/2 and**goes until searching is done.
40. If you apply the recursive equation for the binary search algorithm then
41. T(n)=T(n/2)+1 to solve the problem
42. n/2^k=1
43. taking log on both sides
44. log n=log (2^k)
45. log n= k log 2
46. k=log n base 2.
47. N=7
48. K=log 7 base 2 = 3
49. K=3
50. So, the answer becomes 3.
52. **Q5.** What would be the output of the following pseudocode?
53. Integer i, j, k
54. Set k = 8
55. for(each i from 1 to 1)
56. for(each j from the value of i to 1)
57. print k+1
58. end for
59. end for
61. A.     2
62. B.     9
63. C.     7
64. D.     8
65. **Ans:** B
66. **Explanation:**
68. There are three variables i, j and k declared. Value initialized for k is 8, In this code, we are moving with nested for loop.
69. Here I value is 1, for loop will check the condition i<=1 condition gets true. Now, moving with inner for loop j value will be 1 condition gets true j<=1.so, it prints K+1. Then j value will be incremented by 1(2<+1) inner for loop condition gets false.
70. On the next iteration i value will be incremented by 1, here updated i value is 2 (2<=1) condition get false. So the answer is 9.

73. **E.g. code to explain this:**
74. int i, j, k;
75. k = 8;
76. for(i=1 ;i<=1;i++){   => i=1 True
77. for(j=i;j<=1;j++){  => j=1 true
78. cout<< k+1;    => print k+1 => 8+1 =>9
79. }
80. }

83. **Q6.**What will be the output of the following pseudocode?
84. Integer a, b
85. Set a = 15, b = 7
86. a = a mod (a - 3)
87. b = b mod (b – 3)
88. a = a mod 1
89. b = b mod 1
90. Print a + b
92. **A)** 15
93. **B)** 7
94. **C)** 2
95. **D)** 0
97. [Note-mod finds the remainder after the division of one number by another. For example, the expression “5 mod 2” leaves a quotient of 2 and a remainder of 1]

100. **Answer:**0
102. **Explanation:**
103. There are two variables a and b declared. Value initialized for a is 15 and b is 7. Taking mod operation for a by 12(a%12) and the answer is 3 will stored in a.
104. The next mod operation for b is 7 mod (7%4). The answer is 3 will be stored in b.
105. The next line takes the updated value of a and mods it by 1(3%1). Then the answer becomes 0 will be stored in a.
106. Next line takes the updated value of b mod by 1 (3%1) then the answer is 0. Finally adding all the updated values of a and b (0+0 ) and the output of Pseudocode is 0.

109. **Q7.** What will be the output of the following pseudocode?
110. Integer a, b, c
111. Set b = 5, a = 2, c = 2
112. if(b>a && a>c && c>b)
113. b = a + 1
114. Else
115. a = b + 1
116. End if
117. Print a + b + c
118. [Note-&&: Logical AND - The logical AND operator (&&) returns the Boolean value true(or 1) if both operands--. If (x) gets executed if the value if(), i.e., x is not zero]
120. **A)** 2
121. **B)** 13
122. **C)** 26
123. **D)** 5
124. **Ans:**B
125. **Explanation:**
126. There are three variables a, b and c declared. Value initialized for a is 2, b is 5 and c is 2.
127. Checking the condition using if, b >a and a>c and c>b here if conditions get false. Now else part will execute b value will be incremented by 1 and stored in a, Finally adding all the updated values of a, b and c (6+5+2 ) and the output of Pseudocode is 13.

130. **Q8.**For which of the following applications can you use hashing?
131. 1. To construct a message authentication code.
132. 2. For Timestamping
133. 3. For detecting a cycle in a graph
134. Choose the correct answer from the options given below.
135. A.     Only 1 and 3
136. B.     Only 2 and 3
137. C.     Only 1
138. D.     Only 1 and 2
140. **Ans:**D
141. **Explanation:**
142. Constructing a message authentication code and Timestamping are the real-time applications for hashing.
143. **Q9.**Consider an array of float. Calculate the difference between the address of the 1st and 4th element, assuming float occupies 4 bytes of memory.
144. A.     16
145. B.     4
146. C.     12
147. D.     8
148. **Ans:** C
149. **Explanation:**
150. Let's consider the address of elements:
151. 1st element – 1000 - 1003 (4 bytes)
152. 2nd element – 1004 - 1007 (4 bytes)
153. 3rd element – 1008 – 1011 (4 bytes)
154. 4th element - 1012 – 1015 (4 bytes)
155. The difference between the address of the 1st and 4th element is 12.
157. **Q10.**What is the second part of a node in a linked list that contains the address of the next node called?
158. A.     data
159. B.     pointer
160. C.     element
161. D.     Link
162. **Ans:**D
163. **Explanation:**
164. The field of each node that contains the address of the next node is usually called the 'link'.

167. **Q11.**If you are using Depth-first search (DFS) for traversing an unweighted graph, then which of the following will happen?
168. 1. It produces the minimum spanning tree
169. 2. It produces all pair shortest path tree
170. Choose the correct answer from the options given below.
171. A.     Both 1 and 2 are true
172. B.     Both 1 and 2 are false
173. C.     Only 2 is true
174. D.     Only 1 is true
175. **Ans:**D
176. **Explanation:**
177. Depth-first search (DFS) for traversing an **unweighted graph**, will produce the minimum spanning tree.
178. Only Depth-first search (DFS) for traversing an **weighted graph**, will produce all pair shortest-path tree.

181. **Q12.**With the given the information provided find out the address of Arr[17] in a 1-D array Arr[30].
182. - lower bound = 1
183. - starting base address = 1100
184. - size of each element is 2.
186. A.     1132
187. B.     1070
188. C.     1128
189. D.     1068
190. **Ans:**A
191. **Explanation:**
192. We need to find the address of Arr[17]. Starting base address is 1100.
193. Arr[1] – 1100 (2bytes)
194. Arr[2] – 1102 (2bytes)
195. Arr[3] – 1104 (2bytes)
196. Arr[4] – 1106 (2bytes)
197. Arr[5] – 1108 (2bytes)
198. Arr[6] – 1110 (2bytes)
199. Arr[7] – 1112 (2bytes)
200. Arr[8] – 1114 (2bytes)
201. Arr[9] – 1116 (2bytes)
202. Arr[10] – 1118 (2bytes)
203. Arr[11] – 1120 (2bytes)
204. Arr[12] – 1122 (2bytes)
205. Arr[13] – 1124 (2bytes)
206. Arr[14] – 1126 (2bytes)
207. Arr[15] – 1128 (2bytes)
208. Arr[16] – 1130 (2bytes)
209. **Arr[17] – 1132 (2bytes)**
211. **Thus, the Answer for arr[17] is 1132**
213. **Q13.**What will be the output of the following pseudocode?
214. Integer arr[]={10, 20, 30, 40, 5}
215. Integer a, s
216. Set s = 0
217. Set a = arr[1] + arr[2]
218. Print a

221. **A)** 25
222. **B)** 5
223. **C)** 50
224. **D)** 40
225. **Ans:**C
227. **Explanation:**
228. There is an array of integer arr[]={10,20,30,40,50}. There are two variables a and b declared. . The value initialized for s is 0. On next line adding the 1st index value 20 and 2nd index value 30 arr[1] + arr[2]( 20+30) the answer is 50 will be stored in a. Finally printing the updated values of a is 50.

231. **Q14.**What will be the output of the following pseudocode?
232. Integer a, b, c
233. Set b = 2, a = 2
234. c = a ^ b
235. Print c
236. [Note- ^ is the bitwise exclusive OR operator that compares each bits of its first operand to the corresponding bit of its-- other bit is 1, the corresponding result bit is set to 1. Otherwise, the corresponding result bit is set to 0]
237. **A)** 6
238. **B)** 4
239. **C)** 0
240. **D)** 2
241. **Ans:**C
243. **Explanation:**
245. There are three variables a, b and c declared. Value initialized for a is 2 and b is 2. When we do a bitwise exclusive OR of c i.e (2^2), the answer is 0. Finally, print the value of c.
247. **Q15.**Which of the following series will be printed by the given pseudocode?
248. Integer i, j, k, n
249. Set j=1, k=1
250. for(each i from 1 to 5)
251. print k
252. j=j+1
253. k=k+j
254. end for
256. **A)** 1 3 6 10 15
257. **B)** 1 2 3 4 5
258. **C)** 2 4 6 8 10
259. **D)** 1 1 2 3 5
261. **Ans:**A
263. **Explanation:**
264. There are four variables i, j,k and n declared. Value initialized for j is 1 and k is 1.
265. For loop, i value starts from 1 loop will run till the i<5, In the first iteration i value, is 1, printing k value is 1. Next line j value will be incremented by 1 (1+1) =>2. On the next line adding k and j (1+2), then the answer is 3.
266. 2nd iteration i value will be incremented by 1, i=2. Print k, the updated k value is 3. on the next line j value will be incremented by 1 (2+1) =>3. On the next line adding k and j (3+3) , then the answer is 6.
267. 3rd iteration i value will be incremented by 1, i=3. Print k, the updated k value is 6. on the next line j value will be incremented by 1 (3+1) =>4. On the next line adding k and j (6+4) , then the answer is 10.
268. 4th iteration i value will be incremented by 1, i=4. Print k, the updated k value is 10. on the next line j value will be incremented by 1 (4+1) =>5. On the next line adding k and j (10+5) , then the answer is 15.
269. 5th iteration i value will be incremented by 1, i=5. Print k, the updated k value is 15. Next line j value will be incremented by 1 (5+1) =>6. On the next line adding k and j (15+6), then the answer is 21.
270. Here for loop condition gets false, it comes out of the *for* loop. The output of Pseudocode is 1 3 6 10 15.

273. Capgemini Pseudo Code MCQs (previously asked)
274. **Question 1:**
275. Find the output of the following pseudo-code:
276. Integer x,y,z;
277. x=0
278. y=1
279. x = y = z = 8
280. Print x
281. **Options:**
282. A)   0
283. B)   8
284. C)   1
285. D)   None of the above
286. **Correct answer: Option B**
287. **Explanation:**  In this question, the value of x is initialized as 0 and y as 1 in the beginning. Later the value 8 is assigned to the variable z and the value of z is assigned to the variable y and the value of y is assigned to the variable x. Finally, the value of x is updated as 8.
288. **Question 2:**
289. Find the output of the following pseudo-code:
290. Integer value, n
291. Set value = 1, n = 45
292. while(value less than equal to n)
293. value = value << 1
294. end loop
295. Print value
296. **Options:**
297. A)   64
298. B)   32
299. C)   45
300. D)   None of the above
301. **Correct answer: Option A**
302. **Explanation:** Here, the left shift operation pushes the values towards the left once; when 1 is left shifted the value what we will be obtaining will always be 2 to the power something. When one is converted in the beginning and not shifted the value will be 2^0 which is 1. Next iteration it will be pushed one place towards the left, therefore the value now will be 2^1 which is 2 ; this will go on happening until the value stored is greater than 45 . The value which is greater than 45 in 2 powers is 64. Now the loop terminates and the last value stored in the variable is 64 and the same will be printed.
303. **Question 3:**
304. Find the output of the following pseudo-code:
305. Integer c, d
306. Set c = 15, d = 12
307. d = c – 1
308. Print c //line
309. c = d + (c – 2)
310. if(c < 40)
311. Goto line
312. end if
313. **Options:**
314. A)   14 26 38
315. B)   27 39
316. C)   15 27 39
317. D)   None of the above
318. **Correct answer: Option C**
319. **Explanation:** c and a is initialised, and d as well; line 5 we are re-initialzing c in every iteration of goto; the goto loop terminates only when the value of c is greater than 40 the last value stored in c which breaks the if condition is 51 and all the numbers 15 27 and 39 will be printed according to the algebraic expression in line number 5.
320. **Question 4:**
321. Find the output of the following pseudo-code if x= 4 and y=5:
322. Integer fun(int x, int y)
323. if(x > 1)
324. fun(x – 2, y + 2)
325. end if
326. print y
327. End function fun()
328. **Options:**
329. A)   4 5 6
330. B)   7 6 5
331. C)   9 7 5
332. D)   None of the above
333. **Correct answer: Option C**
334. **Explanation:** the first reverse recursion would print 9 and returns to previous function call, next it prints 7 and returns to very first function call finally it prints a 5 and complets the execution.
335. **Question 5:**
336. How many times will the print statement be executed:
337. Integer a, b, c
338. Set a = 8, b = 10, c = 6
339. If(a > c AND (b + c) > a)
340. Print a
341. end if
342. if(c > b OR (a + c) > b)
343. Print b
344. end if
345. if((b+c) MOD a EQUALS 0)
346. Print c
347. end if
348. **Options:**
349. A)   2
350. B)   3
351. C)   1
352. D)   0
353. **Correct answer: Option B**
354. **Explanation:** All the conditions are true when checked with the condition so the print statement will be executed 3 times.
355. **Question 6:**
356. What will be the output if the following pseudocode if a=10 and b=6:
357. Integer func (Integer a, Integer b)
358. Integer temp
359. while(b)
360. temp = a MOD b
361. a = b
362. b = temp
363. end while
364. return a
365. End function func()
366. **Options:**
367. A)   2
368. B)   4
369. C)   3
370. D)   1
371. **Correct answer: Option A**
372. **Explanation:** The while loop will only terminate when the value of b becomes zero, this will happen only after the 4th iteration when the last value of the b will be zero and value of a is 2
373. **Question 7:**
374. What will be the output of the following pseudo code?
375. Integer x, y, z
376. Set x=24, y=8
377. x = x/y
378. z = y<<x
379. Print z
380. [Note: << is left shift operator, it takes two numbers, left shifts the bits of the first operand, the second operand decodes the number of …]
381. **Options:**
382. A)   1
383. B)   8
384. C)   0
385. D)   64
386. **Correct answer: Option D**
387. **Explanation:** When the x is reinitialised in line 3 the value stored will be 3. Therefore 8 has to be left shifted thrice. The shifted value is the 3rd next power of 2 that is 2^6 and the value is 64.
388. **Question 8:**
389. What will be the output of the following pseudocode?
390. Integer x, y, z, a
391. Set x = 2, y = 1, z = 5
392. a = (x AND y) OR (z + 1)
393. Print a
394. **Options:**
395. A)   5
396. B)   3
397. C)   2
398. D)   1
399. **Correct answer: Option D**
400. **Explanation:** AND gate works when both the conditions are true so the first (x and y) condition will be taken as true as the both the inputs are true. OR gate works when any of the conditions are true, where it has already got one of its input as true so without checking the other input it will directly assign the value as 1.
401. **Question 09:**
402. What will be the output of the following pseudocode?
403. Integer a=5, b=4, c=3
404. a = b + c
405. c = a – b
406. c = c + a
407. c = b + c
408. b = b + c
409. Print a, b, c
410. **Options:**
411. A)   7 14 7
412. B)   7 14 10
413. C)   7 8 14
414. D)   7 18 14
415. **Correct answer: Option D**
416. **Explanation:** The intial values of a=5, b=4, c=3
417. a = 4 +3 = 7
418. c = 7 – 4 = 3
419. c = 3 + 7 = 10
420. c = 4 + 10 = 14
421. b = 4 + 14 = 18
422. Print 7, 18, 14
423. **Question 10:**
424. What will be the output of the following pseudocode?
425. Integer a, b, c, d
426. Set b = 18, c = 12
427. a = b – c
428. for (each c from 1 to a – 1)
429. b = b + c + 12
430. b = b/5
431. d = b + a
432. end for
433. c = a + b + c
434. Print a b c
435. **Options:**
436. A)   5 3 9
437. B)   6 14 17
438. C)   6 4 14
439. D)   6 4 16
440. **Correct answer: Option D**
441. **Explanation:** The loop runs for 5 times ; after the 5th iteration the value of a=6; b=4; c=10.
442. So the final answers are 6, 4, 16
443. **Question 11:**
444. Which of the following operations is possible on an array?
445. **Options:**
446. A)   All of the mentioned options
447. B)   Insertion
448. C)   Searching
449. D)   Sorting
450. **Correct answer: Option A**
451. **Explanation:** It is trickier when it comes to arrays to do he operation on comparison with the linked lists. But they are definitely possible
452. **Question 12:**
453. An abstract data type is defined to be a mathematical model of a user-defined type along with the collection of all \_\_\_\_\_\_\_\_ operations on that model.
454. **Options:**
455. A)   Union
456. B)   Assignment
457. C)   Primitive
458. D)   None of the above
459. **Correct answer: Option A**
460. **Explanation:** In computer science, an abstract data type (ADT) is a mathematical model for data types. An abstract data type is defined by its behaviour (semantics) from the point of view of a user, of the data, specifically in terms of possible values, possible operations on data of this type, and the behaviour of these operations. These are not possible in union and assignment operations.
461. **Question 13:**
462. What do we call the binary tree nodes with no successor?
463. **Options:**
464. A)   End nodes
465. B)   Terminal nodes
466. C)   Last nodes
467. D)   Final nodes
468. **Correct answer: Option B**
469. **Explanation:** The official terminology is Terminal node or leaf node;
470. **Question 14:**
471. What do we call the highest element of an array’s index?
472. A)       Upper bound
473. B)       Lower bound
474. C)       Range
475. D)       Extraction
476. **Correct answer:** Option A
477. **Explanation:** The upper bound is always the highest element of an array index.
478. **Question 15:**
479. Which of the following data types represents many to many relations?
480. A)       Both plex and graph
481. B)       Graph
482. C)       Plex
483. D)       Tree
484. **Correct answer:** Option A
485. **Explanation:** A many-to-many relationship occurs when multiple records in a table are associated with multiple records in another table. This is possible only with the help of Both plex and graph.
486. **Question 16:**
487. Which of the following is NOT a type of linked list?
488. A)       Double ended linked list
489. B)       Double linked list
490. C)       Simple linked list
491. D)       Circular linked list
492. **Correct answer:**Option A
493. **Explanation:**We just have 3 types of linked list among the given options b, c and d. double ended linked list does not exist.
494. **Question 17:**
495. Each node of the graph is represented as a \_\_\_\_\_\_\_?
496. A)     Vertex
497. B)     Root
498. C)     Path
499. D)    Edge
500. **Correct answer:** Option A
501. **Explanation:** Every node cannot be a root node and path , edge is realted to the directions of the graph.
502. **Question 18:**
503. Recursion uses more memory space than iteration. Which of the following is/are the valid reason for the same?
504. A.       It uses the stack instead of a queue
505. B.       Every recursion call has to be stored
506. Choose the correct answer from the options given below.
507. A)       Only A
508. B)       Both A and B
509. C)       Neither A nor B
510. D)       Only B
511. **Correct answer:**Option A
512. **Explanation:**Recursive functions use stack as the memory space technique. And also as rightly pointed out the call has to be present to store the returned values.
513. **Question 19:**
514. To which of the following domain problem does the knapsack problem belong?
515. A)       NP- complete
516. B)       Sorting
517. C)       Optimisation
518. D)       Linear Solution
519. **Correct answer:** Option C
520. **Explanation :** knapsack algorithm is used to find the maximum profit out of the least weight combination possible, therefore it is definitely belongs to a optimisation domain