

Sample Solution 01

24. (B)

Regardless of the value of x , 2^{x+1} will always be double the value of 2^x .

For example:

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

$$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$$

When you look at the example above, you can see that the an exponent increased by one results in one more multiplication by 2.

Sample Solution 02

14. (B)

In a question like this, the secret is usually to convert all of the numbers to base 10 so you can compare them properly; however, in this case the conversion is not necessary. Note that all of the numbers have the exact same digits. They are all 1011. The only difference is the bases. This means we can simply sort the numbers by their bases since a bigger base would yield a bigger value for the same digits.

Sample Solution 03

19. (C)

The table below keeps track of the values of a , b and c which are all displayed at the end of this code segment:

a	b	c	Command:
"10"	"20"		
		"10"	$c \leftarrow a$
"20"			$a \leftarrow b$
	"10"		$b \leftarrow c$

Sample Solution 04

24. (C)

This question is similar to the previous question, but there are some important differences. First, the value of k is not increased until after it is displayed for the first time. This means the first value displayed for k must be 0 ; which means answer choices (A) and (D) are not possible outputs.

Another important difference is that now, n is assigned a random integer between 1 and 5 inside the loop. In the previous program, n was assigned a random value at the beginning of the program and this value would accumulate as the value of k was repeatedly added to it. In this program, n cannot accumulate because it keeps getting reassigned.

Since the random number assigned to n cannot be greater than 5 and since k will max out at 3, the largest possible value for $n + k$ would be 8. This makes answer choice (B) not possible since it shows a value of 11.

Sample Solution 05

18. (C)

This program checks to see if you truly understand what happens with the FOR EACH loop. The first FOR EACH loop is almost identical to the one from the previous program. The only difference is that the new value assigned to `item` each time through the loop is 99 instead of 555. This is why the first line of output has five 99s. Then there is another FOR EACH loop that traverses and displays the contents of the array.

It may seem like this would display another line of output with five 99s; however, this is not the case. In a FOR EACH loop, the traversing variable, `item` in this case, receives a copy of each element in the array as it traverses. This gives you the ability to access the information in the array, but not the ability to change it. This is why the second line of output shows the array's original numbers.

Sample Solution 06

06. (A)

In the `mystery` procedure, variable x is initially assigned the value of a . Then if b is greater x , x will be reassigned the value of b . Then if c is greater x , x will be reassigned the value of c . The result is that by the end of the `mystery` procedure, x will be storing the value of the largest parameter, which is then returned.

Sample Solution 07

08. (D)

Answer choices (A) and (B) are not correct because in both cases the loop will stop before the robot gets to the final square. It may seem like answer choice (B) would work because the robot does need to move forward 16 times; however, the loop stops when $n = 16$. It does not actually move a 16th time.

It would work if the condition said REPEAT UNTIL ($n > 16$) or REPEAT UNTIL ($n = 17$).

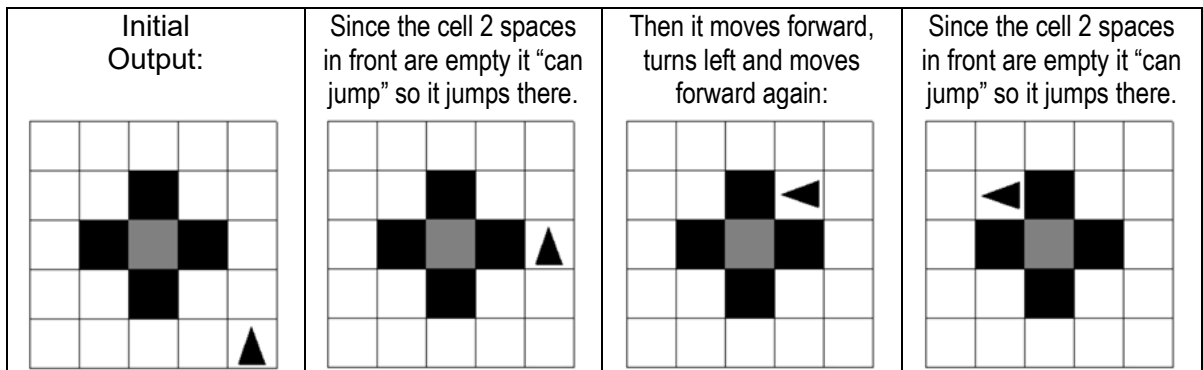
Answer choice (C) is not correct because if the robot moves forward 5 times before turning, it will move off the grid.

Answer choice (D) is correct because it properly makes the robot move forward 4 spaces, turn right and then repeats this process 4 times, making the robot move as required.

Sample Solution 08

13. (D)

The chart below shows the initial output followed by the position of the robot at different points in the program:



Sample Solution 09

25. (B)

Answer (A) is incorrect. The nature of the Internet is such that many reasons can cause a path suddenly to be unavailable or to slow down, such as hurricanes, blackouts, etc.

Answer (B) is correct. It describes the purpose of the router, which is to get packets to their destination by the best path possible. Best can change and routers adjust with the reality of the Internet.

Answer (C) might work, but that is not used. There is not the need to resend all the packets. Only the packets that never arrived must be resend.

Answer (D) also might work, but is highly inefficient. In the case of a blackout or hurricane issue, it might be days before networking connections are restored.

Sample Solution 10

24. (D)

The definition of a *ransomware attack* is when a hacker attempts to get a large sum of money from a business after disabling their network.

The hacker is disinterested in any information. The purpose is to disrupt the company's network operations until a transfer of money is provided.

Sample Solution 11

58. (B)

Answer choice (A) is not correct because while some cars can detect if they are too close to something while going forward or backward, it does not yet distinguish between cars, people, animals, buildings, etc.

Answer choice (B) is correct because one thing that we have already had for more than two decades is GPS.

Answer choice (C) is not correct because while some truck drivers have a system that detects if they fall asleep, it is not sophisticated enough to detect breathing issues or medical emergencies.

Answer choice (D) is not correct because you do not need to be someone in authority to change the route.

Sample Solution 12

133. [A] & [C]

To answer this question, you need to trace through each of the 4 programs with the robot. Below you see the resulting outputs for each of the 4 programs. They show that only the programs in answer choices (A) and (C) were successful.

