Sample Question 01

24 Imagine that you have an x-bit memory block, which can store q integers. If one bit is added to the memory block for a total of x+1 bits, how many numbers can be stored?

(A) q + 1

(B) 2q

(C) q x q

(D) q + 2

Sample Question 02

14 Consider the following three numbers:

1011 base-2 1011 base-10 1011 base-16

Which of the following sequences shows an order from smallest to largest number value?

(A) 1011 base-16 1011 base-10 1011 base-2

(B) 1011 base-2 1011 base-10 1011 base-16

(C) 1011 base-10 1011 base-16 1011 base-2

(D) 1011 base-2 1011 base-16 1011 base-10

Sample Question 03

19. Consider the adjacent code segment. What is the output of the program?

(A) 10 10

(B) 10 20

(C) 20 10

(D) 20 20

```
a ← "10"
b ← "20"
c ← a
a ← b
b ← c
DISPLAY a
DISPLAY b
```

Sample Question 04

24. Consider the adjacent code segment. Which of the following outputs is possible?

(A)
```
1 3
2 4
3 6
4 9
```

(B)
```
0 1
1 6
2 8
3 11
```

(C)
```
0 1
1 3
2 5
3 5
```

(D)
```
1 2
3 4
5 7
7 11
```

```
k ← 0
REPEAT 4 TIMES
    n ← RANDOM 1, 5
    n ← n + k
    DISPLAY k
    DISPLAY n
    k ← k + 1
```

Sample Question 05

18 Consider the adjacent code segment. Note that the `NEXTLINE` procedure executes a *Carriage Return, Line Feed* (CRLF) after the previous output. What is the output of the program?

(A)
```
11 22 33 44 55
11 22 33 44 55
```

(B)
```
99 99 99 99 99
99 99 99 99 99
```

(C)
```
99 99 99 99 99
11 22 33 44 55
```

(D)
```
11 22 33 44 55
99 99 99 99 99
```

```
list ← [11, 22, 33, 44, 55]
FOR EACH item IN list
{
   item ← 99
   DISPLAY(item)
}
NEXTLINE()
FOR EACH item IN list
{
   DISPLAY (item)
}
```

Sample Question 06

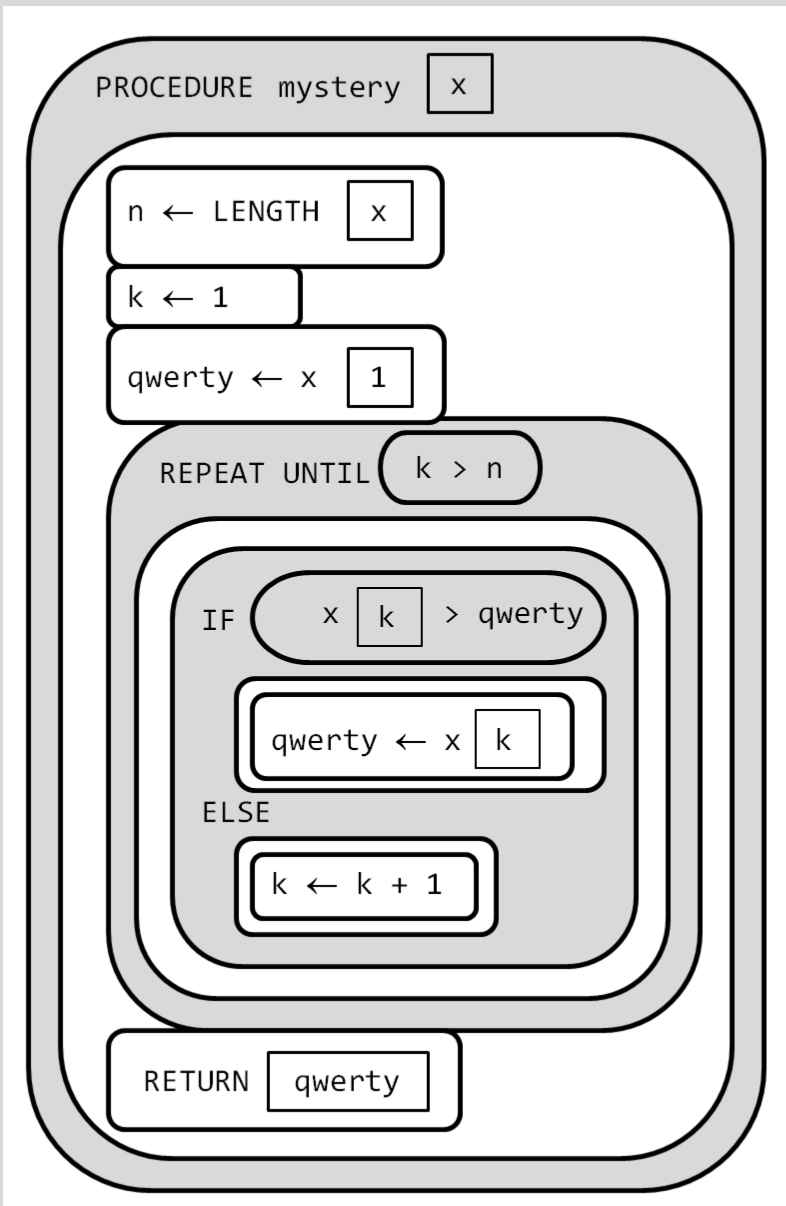
06. Consider the procedure below. What is the result of calling the procedure?
(Parameter x is a list of integers.)

(A) `mystery` returns the largest integer element in list `x`.

(B) `mystery` returns the smallest integer element in list `x`.

(C) `mystery` returns the median element in list `x`.

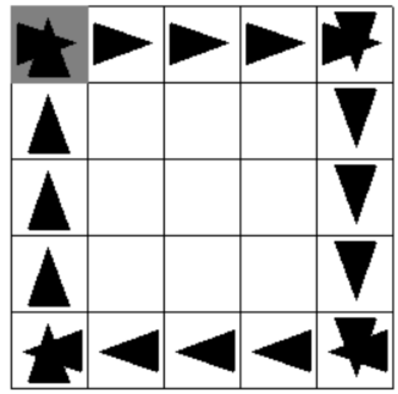
(D) `mystery` returns the mean value of list `x`.



Sample Question 07

08.
The adjacent figure shows a robot in a grid of squares. The black triangle represents the robot, which is initially facing right, starting in the gray square. The grid shows the complete path taken by a robot during its execution. The robot ends in the square where it started and displays every square along its path.

Which of the program segments below will execute the required path? Keep in mind that it is not sufficient to start and end in the gray square. The path, as shown, must be followed.



(A)

```
k ← 0
REPEAT UNTIL n = 15
    k ← k + 1
    MOVE_FORWARD
    IF k MOD 4 = 0
        ROTATE_RIGHT
```

(B)

```
k ← 0
REPEAT UNTIL n = 16
    k ← k + 1
    MOVE_FORWARD
    IF k MOD 4 = 0
        ROTATE_RIGHT
```

(C)

```
REPEAT 5 TIMES
    REPEAT 5 TIMES
        MOVE_FORWARD
    ROTATE_RIGHT
```

(D)

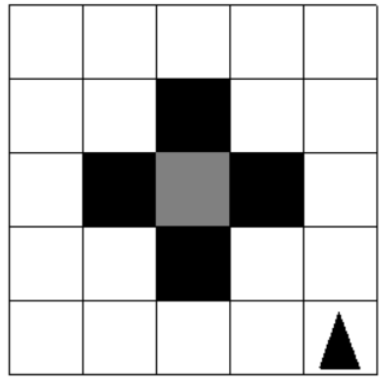
```
REPEAT 4 TIMES
    REPEAT 4 TIMES
        MOVE_FORWARD
    ROTATE_RIGHT
```

Sample Question 08

13.

The adjacent figure shows a robot in a grid of squares. The black triangle represents the robot, which is initially facing North.

Now consider the program code below that is meant to move the robot to the gray square during execution.



Consider the adjacent code segment.

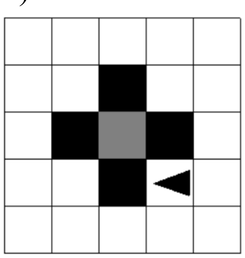
Command `JUMP_FORWARD` moves forward two cells in the direction that the robot is facing. If the robot is facing a black cell it can jump over one black cell.

`Command JUMP_FORWARD` works together with command `CAN_JUMP`, which returns `true` if a cell is available in the direction that the robot will jump or return `false` otherwise.

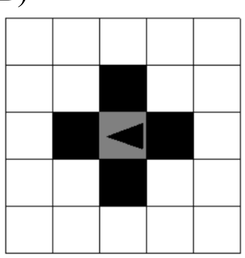
Which one of the grids below shows the correct robot location after running the adjacent code segment?

```
IF (CAN_JUMP())
   JUMP_FORWARD()
MOVE_FORWARD
ROTATE_LEFT()
MOVE_FORWARD()
IF (CAN_JUMP())
   JUMP_FORWARD()
```

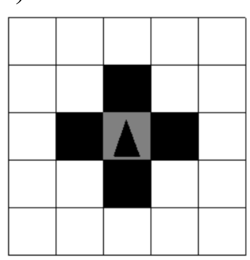
(A)



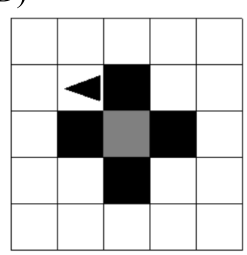
(B)



(C)



(D)



Sample Question 09

25. Large files are transmitted on the Internet from the source computer to the destination computer. The files are not sent whole, but in smaller pieces, called packets, by the router. What is true about the paths of the packets?

(A) The router selects a path and all packets follow that same path.

(B) The router selects a path and switches to a different path if the link is broken. The router may also switch to another path if the delay is too long.

(C) The router selects a path and then resends all the packets if the original path is broken before the transmission is completed.

(D) The router selects a path and then if the path is broken requests information from the destination when the link will be functional and then sends the remaining packet at that later time.

Sample Question 10

24. Attempts to get a large payment from a business by disabling its network is

(A) a phishing attempt.

(B) identity theft.

(C) social engineering.

(D) a ransomware attack.

Sample Question 11

Consider the following scenario for questions 58-62.

Self-driving cars are coming. Yes, they exist today, but they are still in a testing and developing stage. Soon self-driving cars will be as common and normal to people as elevators without an operator are today. A self-driving car is not simply a single computer innovation. It is a highly complex integration of many different technologies, and many different computer innovations. The next five questions will each be based on some of the complexities found on the self-driving car.

58. A self-driving car involves the creation of multiple new computing innovations. Which computing innovation already existed before the development of self-driving cars?

(A) Proximity awareness, which tells the self-driving car everything that is near the car, such as other cars, people, animals and stationary objects like trees and buildings.

(B) Global Position Satelite (GPS)

(C) Passenger medical awareness, such as a passenger being unconscious, having issues with breathing or other medical emergencies.

(D) Authority recognition, which tells the self-driving car that some non-passenger person, like a police officer, can instruct the car to take a different route.

Note:

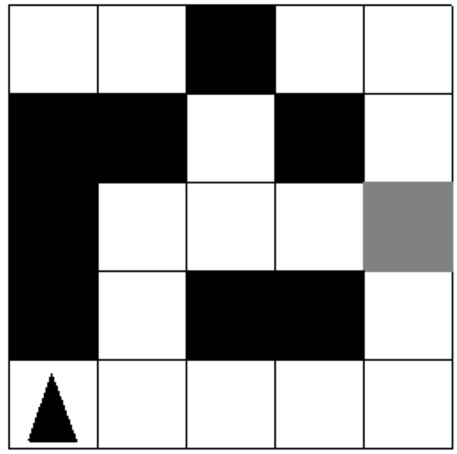
Sample question 11 only shows the first question #58 after the general description of the multiple questions scenario. On the actual AP exam there will 5 questions based on the same scenario.

Sample Question 12

133. <u>Double Answer</u> Question

The adjacent figure shows a robot in a grid of squares. The black triangle represents the robot, which is initially facing upward. The robot can move into a white or gray square, but cannot move into a black square.

Now consider the program segments below that are meant to move the robot to the gray square during execution. Which two of the following four code segments will make the robot finish in the destination gray cell?



[A]

```
ROTATE_RIGHT()
MOVE_FORWARD()
ROTATE_LEFT()
MOVE_FORWARD()
MOVE_FORWARD()
ROTATE_RIGHT()
REPEAT 3 TIMES
{
   MOVE_FORWARD()
}
```

[B]

```
ROTATE_RIGHT()
REPEAT 3 TIMES
{
   MOVE_FORWARD()
}
ROTATE_RIGHT()
MOVE_FORWARD()
MOVE_FORWARD()
```

[C]

```
ROTATE_RIGHT()
REPEAT 4 TIMES
{
   MOVE_FORWARD()
}
ROTATE_LEFT()
MOVE_FORWARD()
MOVE_FORWARD()
```

[D]

```
ROTATE_RIGHT()
REPEAT 4 TIMES
{
   MOVE_FORWARD()
}
ROTATE_LEFT()
REPEAT 3 TIMES
{
   MOVE_FORWARD()
}
```