

AP CSP**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. Consider the program below which outputs the season.

```
x ← <input>
y ← <input>
z ← x + y

IF (x < 4)
{
    DISPLAY ("Winter")
}
ELSE
{
    IF (z < 7)
    {
        DISPLAY ("Spring")
    }
    ELSE
    {
        IF (z > 6 && z < 10)
        {
            DISPLAY ("Summer")
        }
        ELSE
        {
            DISPLAY ("Fall")
        }
    }
}
```

What is the output results with the initial values of x is 3 and y is 5?

- | | |
|-----------|-----------|
| a. Winter | c. Summer |
| b. Spring | d. Fall |

- _____ 2. Recently Jessica gave a speech while running for officer of her club. Her debate coach wants Jessica to refine her public speaking skills by analyzing a transcript he made of her speech. What results will the following program segment create for Jessica's consideration?

```
count =0  
  
for each k in list  
    count=count+1  
  
Display
```

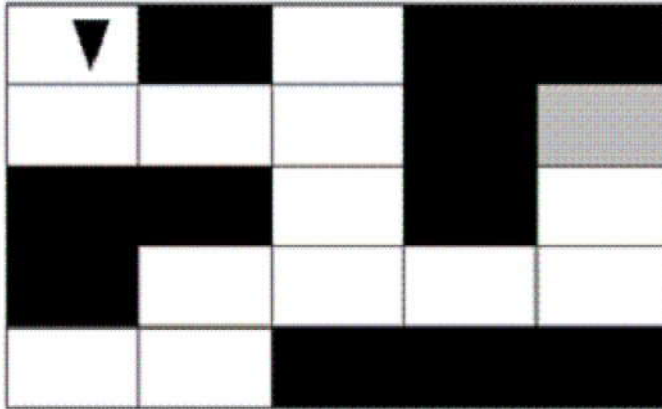
- | | |
|---|--|
| a. The program counts the number of people who like Jessica's speech | c. The program counts the number of words in the speech named "list" |
| b. The program will count the number of times the word "like" was said by Jessica | d. The program will be an infinite loop adding 1 to the variable count |

- _____ 3. **What is output by the code below?**

```
DISPLAY (20 mod 4) + 3
```

- | | |
|------|-------|
| a. 8 | c. 19 |
| b. 3 | d. 27 |

4. The question below uses a robot in a grid of squares. The robot is represented as a triangle, which is initially in the top-left square of the grid and facing downward. The robot can move into a white or gray square, but cannot move into a black region.



Which of the following code segments can be used to move the robot to the gray square?

a.

```
REPEAT 2 TIMES
{
  MOVE_FORWARD
  ROTATE_RIGHT
}
REPEAT 3 TIMES
{
  MOVE_FORWARD ( )
  ROTATE_RIGHT ( )
  MOVE_FORWARD ( )
  MOVE_FORWARD ( )
  ROTATE_LEFT ( )
}
```

c.

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

b.

```
MOVE_FORWARD ( )
ROTATE_LEFT ( )
REPEAT 2 TIMES
{
  MOVE_FORWARD ( )
}
ROTATE_RIGHT
REPEAT 2 TIMES
{
  MOVE_FORWARD ( )
  MOVE_FORWARD ( )
  ROTATE_RIGHT ( )
}
```

d.

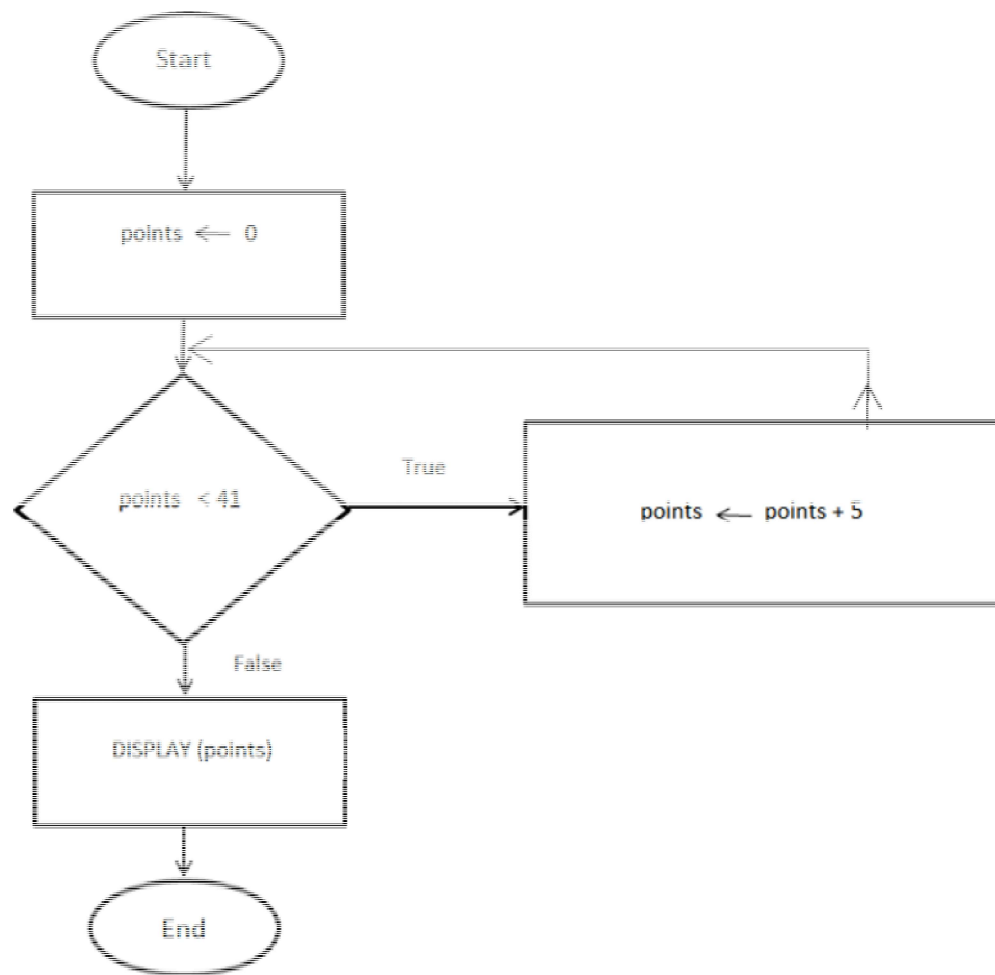
```
MOVE_FORWARD ( )
ROTATE_LEFT ( )
REPEAT 2 TIMES
{
  MOVE_FORWARD ( )
}
ROTATE_RIGHT
REPEAT 3 TIMES
{
  MOVE_FORWARD ( )
  MOVE_FORWARD ( )
  ROTATE_LEFT ( )
}
```

Name: _____

ID: A

5. An algorithm can be visually represented by a flowchart. The flowchart below uses the following building blocks.

Shape	Explanation
Oval	Start/End
Rectangle	Process
Diamond	Decision
Parallelogram	<u>Input/Output</u>



What is displayed as a result of executing the algorithm in the flowchart?

- a. 0
- b. 40
- c. 41
- d. 45

Name: _____

ID: A

_____ 6. Consider the following code segment. What is displayed as a result of execution?

```
d ← 10
e ← 20
f ← 30
e ← d
DISPLAY (e)
DISPLAY (d + e)
```

- | | |
|----------|----------|
| a. 10 10 | c. 10 30 |
| b. 10 20 | d. 10 40 |

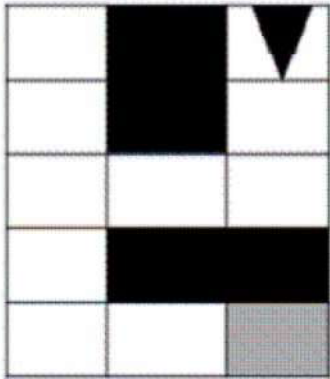
_____ 7. Consider the code below.

```
line 11  l ← 25
line 12  m ← 3
line 13  DISPLAY (l mod m)
line 14
line 15  n ← l * m
line 16  o ← l + m
```

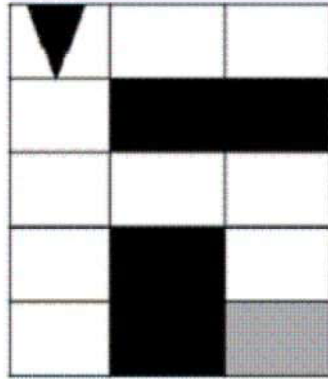
What is the output from line 13?

- | | |
|------|-------|
| a. 1 | c. 8 |
| b. 9 | d. 28 |

8. Two grids are shown below. Each grid contains a robot represented as a triangle with the initial position facing downward. Each robot can move into a white or gray square, but cannot move into a black region.



Grid I



Grid II

For each grid, the program below is intended to move the robot to the gray square. The program uses the procedure `Finish_Race`, which evaluates true if the robot is in the gray square and evaluates to false otherwise.

```

REPEAT UNTIL (Finish_Race ( ))
{
  IF (CAN_MOVE (forward))
  {
    MOVE_FORWARD ( )
  }
  IF (CAN_MOVE (left))
  {
    ROTATE_LEFT ( )
  }
  ELSE
  {
    ROTATE_RIGHT ( )
  }
}

```

For which of the grids does the program correctly move the robot to the gray square

- a. Grid I Only
- b. Grid II Only
- c. Both Grid I and Grid II
- d. Neither Grid I nor Grid II

9. What is the output of the program segment below?

```

a ← "popcorn"
b ← "candy"
c ← "cotton"

```

```

DISPLAY "Do you want cotton"+ b + "or" + a + "?"

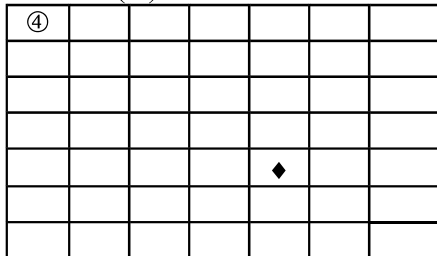
```

- a. Do you want popcorn or candy?
- b. Do you want candy?
- c. Do you want candy or popcorn?
- d. Do you want cotton candy or popcorn?

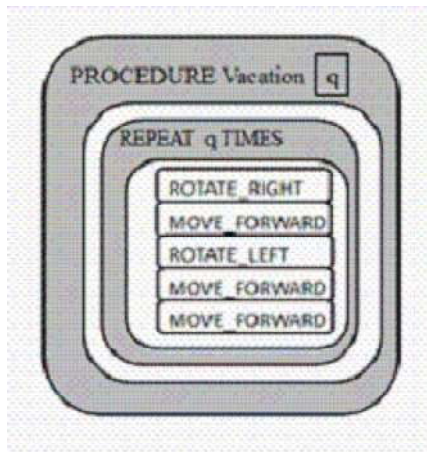
Multiple Response

Identify one or more choices that best complete the statement or answer the question.

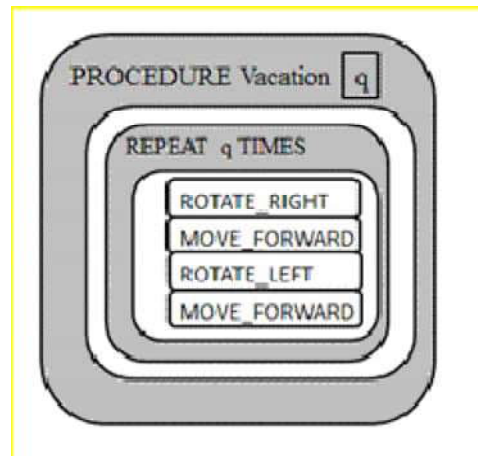
- _____ 10. The question below uses a robot grid of squares. The robot is represented as a triangle, which initially starts in the top-left square facing toward the right side of the grid (④) with the robot's ending position indicated by a diamond (◆):



Code for the procedure Vacation is shown below. Assume that the parameter p has been assigned a positive integer value (e.g., 1, 2, 3...) Which procedure calls could potentially get the robot to the ending position above? (select 2 responses)



a.



c.

b. `PROCEDURE Vacation q`
`REPEAT q TIMES`
`{`
`MOVE_FORWARD ()`
`MOVE_FORWARD ()`
`ROTATE_RIGHT ()`
`MOVE_FORWARD ()`
`ROTATE_LEFT ()`
`}`

d. `PROCEDURE Vacation q`
`REPEAT q TIMES`
`{`
`REPEAT q TIMES`
`{`
`MOVE_FORWARD ()`
`ROTATE_RIGHT ()`
`MOVE_FORWARD ()`
`ROTATE_LEFT ()`
`}`
`}`

Name: _____

ID: A

- _____ 11. Consider the program segment below. Which statements best describe num2 when num1 is any positive integer. (2 responses)

```
IF (num1 < 0)
{
    num2 ← num1 + 10
}
ELSE
{
    num2 ← num1 + 20
}
```

- | | |
|-----------------------|--------------|
| a. A positive integer | c. num1 + 10 |
| b. num1 + 20 | d. 0 |