

AP Computer Science Practice Exam
Units 6 – 8

Part A – Multiple Choice (50 points)

Please circle the best answer.

1. What is the value of the variable x after this code segment completes.

```
int x = 17;  
x /= 2;  
x += 2;  
x *=2;  
x -=2;
```

- A. 17
- B. 18
- C. 19
- D. 20
- E. 21

2. In the following program segment, what will be the final value of the variable sum ?

```
int a = 20;  
int b = 3;  
int c = 6;  
int sum = a + b + c;
```

- A. 6
- B. 23
- C. 29
- D. 138
- E. sum will be an unknown value

3. The expression $!(a || b)$ is equivalent to which of the following expressions?

- A. $(!a) \ \&\& \ (!b)$
- B. $(!a) \ || \ (!b)$
- C. $!(a \ \&\& \ b)$
- D. $(a \ || \ b)$
- E. $(a \ || \ b) \ \&\& \ (a \ \&\& \ b)$

4. Which of the following best describes the circumstances under which the expression

$!(a || b) \ \&\& \ (a || b)$

evaluates to **true**

- A. always
- B. never
- C. whenever both a and b are true
- D. whenever neither a nor b is true
- E. whenever exactly one of a and b is true

5. Consider the following code segment.

```
int b = 28;
int c = b%10 + b/10;

if( c == 1)
    System.out.println("one");

else if( c == 2)
    System.out.println("two");

else if( c == 7)
    System.out.println("seven");

else if( c == 10)
    System.out.println("ten");

else
    System.out.println("none");
```

Which of the following would best show the output after this code segment executes?

- A. "one"
- B. "two"
- C. "seven"
- D. "ten"
- E. "none"

6. Consider the following code segment

```
int num1 = 5, num2 = 4, num3 = 3;

if (num1 < 0)
{
    product = num1 * num2 * num3;
    System.out.println("Product is " + product);
}
else
{
    sum = num1 + num2 + num3;
    System.out.println("Sum is " + sum);
}
```

The output would best be described as:

- A. Product is 60
- B. Product is 5 * 4 * 3
- C. Sum is 12
- D. Sum is 5 + 4 + 3
- E. Product is 60 Sum is 12

For questions 7 and 8, use the following definition of the Point class

```
public class Point
{
    private int myX;
    private int myY;

    // Description: Default constructor method for the Point class
    // postcondition: myX and myY are set to 0
    public Point()
    { <code not shown> }

    // Description: Constructor method for the Point class
    // postcondition: myX is set to x and myY is set to y
    public Point(int x, int y)
    { <code not shown> }

    // Description: Accessor method for X
    // postcondition: returns the value of myX
    public int getX()
    { <code not shown> }

    // Description: Accessor method for y
    // postcondition: returns the value of myY
    public int getY()
    { <code not shown> }

    // Description: Modifier method for X
    // postcondition: myX is set to newX
    public void setX(int newX)
    { <code not shown> }

    // Description: Modifier method for y
    // postcondition: myY is set to newY
    public void setY(int newY)
    { <code not shown> }

    // Description: This method translates this point by dx in the x direction
    //                and dy in the y direction
    // postcondition: dx is added to myX, dy is added to myY
    public void translate(int dx, int dy)
    { <code not shown> }

}
```

7. Which of the following correctly describes the Point class above?

- A. The Point class has 0 constructor methods and 7 non-constructor methods
- B. The Point class has 1 constructor methods and 6 non-constructor methods
- C. The Point class has 2 constructor methods and 5 non-constructor methods
- D. The Point class has 3 constructor methods and 4 non-constructor methods
- E. The Point class has 4 constructor methods and 3 non-constructor methods

8. What is the location of Point p after this code segment completes

```
Point p = new Point(-3, -8);  
  
if (p.getX() > 3)  
    p.translate(-5, 0);  
else if (p.getX() <= 12)  
    p.translate(0, -5);  
else  
    p.translate(-5, -5);
```

- A. (-3, 8)
- B. (-8, 8)
- C. (0, 0)
- D. (-3, -13)
- E. (-8, -13)

9. Consider the following program segment.

```
for (int i = -10; i < 10; i++)  
    System.out.println("*");
```

How many stars are output when this code segment is executed?

- A. 1
- B. 10
- C. 11
- D. 20
- E. 21

10. Consider the following code segment:

```
int x = 0;  
boolean y = true;  
if (y == true && x != 0 && (2/x == 0))  
    System.out.println("success");  
else  
    System.out.println("failure");
```

Which of the following statements about this code segment is true?

- A. There will be an error when the code is compiling because the first && operator is applied to a non-**boolean** expression
- B. There will be an error when the code is compiled because a **boolean** and an **int** variable appear in the same if-statement condition
- C. There will be an error when the code is executed because of an attempt to divide by zero
- D. The code will compile and execute without error; the output will be "success"
- E. The code will compile and execute without error; the output will be "failure"

11. Consider the following code segment :

```
x = !y;  
y = !x;
```

Assume that `x` and `y` are initialized variable of type `boolean`.

Which of the following statements is (are) true? (Hint: try some examples!!)

- I. The final value of `x` is the same as the initial value of `x`.
- II. The final value of `y` is the same as the initial value of `y`.
- III. The final value of `x` is the same as the initial value of `y`.

- A. I only
- B. II only
- C. III only
- D. I and II
- E. II and III

12. Given that `n` is of type `int`, which statement is true about the following code segments?

Version 1

```
for(int count = 1; count <= n; count++)  
{  
    System.out.println(count);  
}
```

Version 2

```
int count = 1;  
  
while (count <= n)  
{  
    System.out.println(count);  
    count++;  
}
```

- A. Version 1 and Version 2 are exactly equivalent for all values of `n`.
- B. Version 1 and Version 2 are exactly equivalent for all values $n \geq 1$, but differ when $n \leq 0$.
- C. Version 1 and Version 2 are exactly equivalent only when $n = 0$.
- D. Version 1 and Version 2 are exactly equivalent only when `n` is even.
- E. Version 1 and Version 2 are not equivalent for any input values of `n`

13. What will the output be for the following poorly formatted programming segment?.

```
int num = 22;
if (num > 0)
if (num % 2 == 0)
System.out.println(num + "is hot");
else System.out.println(num + "is cool");
```

- A. 22 is hot
- B. 4 is hot
- C. 2 is cool
- D. 22 is cool
- E. Nothing will be output

14. Which variable type might best describe your Grade Point Average (GPA)?

- A. int
- B. double
- C. char
- D. String
- E. boolean

15. Consider the following class definition:

```
public class Person
{
    private String myName;

    public Person()
    {
        name = "";
    }

    public String getName()
    {
        return myName;
    }

    public void setName(String name)
    {
        myName = name;
    }
}
```

Which of the following statements is true?

- A. The **Person** class has no constructor methods and three non-constructor member methods.
- B. The **Person** class has one constructor method and two non-constructor member methods.
- C. The **Person** class has two constructor methods and one non-constructor member method.
- D. The **Person** class has three constructor methods and no non-constructor member methods
- E. It is not possible to tell how many constructor methods exist.

For questions 16 – 17, consider the following code segment

```
int a = 2;  
int b = 11;  
int c = b / a;  
  
int d = c + b%a;  
  
a += b;
```

16. What is the value of the variable d after the code segment completes?

- A. 0
- B. 6
- C. 6.5
- D. 13.5
- E. cannot tell from the information provided

17. What is the value of the variable a after the code segment completes?

- A. 0
- B. 2
- C. 6
- D. 13
- E. 17

18. What are the values of x and y after the following code segment completes.

```
int x = 30, int y = 40;
if (x >= 0)
{
    if (x >= 100)
    {
        y = x*3;
        if (y < 50)
            x /= 10;
    }
    else
        y = x*2;
}
else
    y = -x;
```

- A. $x = 30$ $y = 90$
 - B. $x = 30$ $y = -30$
 - C. $x = 30$ $y = 60$
 - D. $x = 3$ $y = -3$
 - E. $x = 30$ $y = 40$
-

19. Consider the following code segment.

```
int x = 10, int y = 0;
while (x > 5)
{
    y = 3
    while (y < x)
    {
        y *= 2;
        if (y%x == 1)
            y += x;
    }
    x -= 3;
}
System.out.println(x + " " + y);
```

What will be output after execution of this code segment?

- A. 1 6
- B. 7 12
- C. -3 12
- D. 4 12
- E. -3 6

20. Consider the following program:

```
public class Question20
{
    public static void main(String [] args)
    {
        Vic toy = new Vic();
        toy.moveOn();
        toy.moveOn();
        toy.moveOn();

        if(toy.seesCD())
            toy.takeCD();
        else
            Vic.say("No CD in slot");
    }
}
```

Given the following CD collection,

a1	___	c1	END
----	-----	----	-----

which of the following best describes what the program does?

- A. nothing
- B. the Vic object, toy, takes a CD from a slot of the collection
- C. the program outputs the phrase "No CD in slot" to the screen
- D. the program fails because the Vic object moves off the end of the CD collection
- E. the program fails because the Vic object tries to see a CD before knowing if there is a slot

Part B – Programming Open Response (50 points)

Name _____

1. Write an application that creates two Vic objects and performs the following task.

For each slot that both Vics have valid slots, do the following:

- if both Vics have CDs, take the CD's and put them on the stack, and move both Vics to the next slot
- if only one of the Vics have CDs in there slots, move the CD from the Vic that does to the Vic that does not, and move both Vics to the next slot
- if neither of the Vics have CDs, fill the empty slots with CD's from the stack (if there are CD's on the stack) and move both Vics to the next slot

Do this while both Vics have a slot.

```
public class OpenResponse1
{
    public static void main(String [] args)
    {
```

2. Write the following method, `toBeABee`. You should return 0 if the bee is a queen, you should return 1 if the bee is a female, but not the queen, and you should return 2 if the bee is a male, unless the season is Fall, then if the bee is a male you should return -1.

`toBeABee(true, false, false) → 0`

`toBeABee(false, true, false) → 2`

`toBeABee(false, true, true) → -1`

`toBeABee(false, false, true) → 1`

`toBeABee(false, false, false) → 1`

```
public int toBeABee(boolean isQueen, boolean isMale, boolean isFall)
{
```

3. Given two `int` values, return whichever value is smaller. However if the two values are both even or both odd, then the return the larger value. However, in all cases, if the two values are the same, return 0. Note: the `%` "mod" operator computes the remainder, e.g. `7 % 5` is 2 and can be used to determine if a number is even or odd.

`minEvenOdd(2, 3) → 2`

`minEvenOdd(6, 2) → 6`

`minEvenOdd(3, 7) → 7`

`minEvenOdd(10, 10) → 0`

```
public int minEvenOdd(int a, int b)
{
```

4. Write a method that computes the number of cubes in a pyramid of cubes that is n cubes high.

For example:

`pyramidOfCubes(0)` → 0 because a pyramid 0 cubes high has no cubes

`pyramidOfCubes(1)` → 1 because a pyramid only 1 cube high has only 1 cube

`pyramidOfCubes(2)` → 5 because a pyramid 2 cubes high has $1 + 4$ cubes

`pyramidOfCubes(4)` → 30 because a pyramid 4 cubes high has $1 + 4 + 9 + 16$ cubes

`pyramidOfCubes(7)` → 140 because a pyramid 7 cubes high has $1 + 4 + 9 + 16 + 25 + 36 + 49$ cubes

```
public int pyramidOfCubes(int n)
{
```