9/10

## AP Computer Science Problem Set 2

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√1. D

Refer to these declarations:

```
Integer k = new Integer(8);
Integer m = new Integer(4);
```

Which test will *not* generate an error?

```
  I if (k.intValue() == m.intValue())...
 II if ((k.intValue()).equals(m.intValue()))...
III if ((k.toString()).equals(m.toString()))...
```

← Can't use methods on ints

(A) I only

(B) II only

(C) III only

[✓ (D)] I and III only

(E) I, II, and III

√2. E

One of the rules for converting English to Pig Latin states: If a word begins with a consonant, move the consonant to the end of the word and add "ay". Thus "dog" becomes "ogday," and "crisp" becomes "rispcay". Suppose s is a String containing an English word that begins with a consonant. Which of the following creates the correct corresponding word in Pig Latin? Assume the declarations

```
String ayString = "ay";
String pigString;
```

(A)
```
pigString = s.substring(0, s.length()) + s.substring(0,1)
          + ayString;
```

(B)
```
pigString = s.substring(1, s.length()) + s.substring(0,0)
          + ayString;
```

(C)
```
pigString = s.substring(0, s.length()-1) + s.substring(0,1)
          + ayString;
```

(D)
```
pigString = s.substring(1, s.length()-1) + s.substring(0,0)
          + ayString;
```

"og" 'd'

[✓ (E)]
```
pigString = s.substring(1, s.length()) + s.substring(0,1)
          + ayString;
```

"ay"

√3. C

The following program segment is intended to find the index of the first negative integer in arr[0] ...arr[N-1], where arr is an array of N integers.

```
int i = 0;
while (arr[i] >= 0)
{
     i++;
}
location = i;
```

This segment will work as intended

(A) always.
(B) never.
[✓ (C)] whenever arr contains at least one negative integer.
(D) whenever arr contains at least one nonnegative integer.
(E) whenever arr contains no negative integers.

✗4. A
E

Refer to the following code segment. You may assume that arr is an array of int values.

```
int sum = arr[0], i = 0;
while (i < arr.length)
{
     i++;
     sum += arr[i];
}
```

starts @ arr[0]

Which of the following will be the result of executing the segment?

[✓ (A)] Sum of arr[0], arr[1], ..., arr[arr.length-1] will be stored in sum.
(B) Sum of arr[1], arr[2], ..., arr[arr.length-1] will be stored in sum.
(C) Sum of arr[0], arr[1], ..., arr[arr.length] will be stored in sum.
(D) An infinite loop will occur.
[✓ (E)] A run-time error will occur.

√5. A

Refer to the following code segment. You may assume that array arr1 contains elements arr1[0], arr1[1], . . . , arr1[N-1], where N = arr1.length.

```
int count = 0;
for (int i = 0; i < N; i++)
    if (arr1[i] != 0)
    {
        arr1[count] = arr1[i];
        count++;
    }
int[] arr2 = new int[count];
for (int i = 0; i < count; i++)
    arr2[i] = arr1[i];
```

~~0604002~~
~~000000~~
~~c=2~~
c=

0604002 i=0 c=0
6604002 i=1 c=1
6604002 i=2 c=1
6404002 i=3 c=2

$\boxed{642}$

If array arr1 initially contains the elements 0, 6, 0, 4, 0, 0, 2 in this order, what will arr2 contain after execution of the code segment?

[✓ (A)] 6, 4, 2
(B) 0, 0, 0, 0, 6, 4, 2
(C) 6, 4, 2, 4, 0, 0, 2
(D) 0, 6, 0, 4, 0, 0, 2
(E) 6, 4, 2, 0, 0, 0, 0

√6. D

Which of the following initializes an 8 × 10 matrix with integer values that are perfect squares? (0 is a perfect square.)

```
I  int[][] mat = new int[8][10];
```

0 is Square!

```
II int[][] mat = new int[8][10];
   for (int r = 0; r < mat.length; r++)
       for (int c = 0; c < mat[r].length; c++)
           mat[r][c] = r * r;
```

✓

```
~~III~~ int[][] mat = new int[8][10];
    for (int c = 0; c < mat[r].length; c++)
        for (int r = 0; r < mat.length; r++)
            mat[r][c] = c * c;
```

r isn't init

(A) I only
(B) II only
(C) III only
[✓ (D)] I and II only
(E) I, II, and III

7. A Consider a class that has this private instance variable:

```
private int[][] mat;
```

The class has the following method, `alter`.

```
public void alter(int c)
{
    for (int i = 0; i < mat.length; i++)
        for (int j = c + 1; j < mat[0].length; j++)
            mat[i][j-1] = mat[i][j];
}
```

If a 3 × 4 matrix `mat` is

```
1 3 5 7
2 4 6 8
3 5 7 9
```

Mat[0][1] = mat[0][2]
Mat[0][2] = mat[0][3]

then `alter(1)` will change `mat` to

(A)
```
1 5 7 7
2 6 8 8
3 7 9 9
```

(B)
```
1 5 7
2 6 8
3 7 9
```

(C)
```
1 3 5 7
3 5 7 9
```

(D)
```
1 3 5 7
3 5 7 9
3 5 7 9
```

(E)
```
1 7 7 7
2 8 8 8
3 9 9 9
```

**Questions 8 - 9 refer to the following `BingoCard` class declaration.**

```
public class BingoCard
{
    private int[] myCard;

    /* Default constructor: Creates BingoCard with
     * 20 random digits in the range 1 - 90. */
    public BingoCard()
    { /* implementation not shown */ }

    /* Display BingoCard. */
    public void display()
    { /* implementation not shown */ }
        ...
}
```

A program that simulates a bingo game declares an array of `BingoCard`. The array has `NUMPLAYERS` elements, where each element represents the card of a different player. Here is a code segment that creates all the bingo cards in the game:

```
/* declare array of BingoCard */
/* construct each BingoCard */
```

√8. D Which of the following is a correct replacement for
`/* declare array of BingoCard */`?

(A) ~~`int[] BingoCard = new BingoCard[NUMPLAYERS];`~~

(B) `BingoCard[] players = new int[NUMPLAYERS];`

(C) `BingoCard[] players = new BingoCard[`~~`20`~~`];`

[✓ (D) `BingoCard[] players = new BingoCard[NUMPLAYERS];`]

(E) ~~`int[] players = new BingoCard[NUMP`~~`LAYERS];`

√9. C

Assuming that `players` has been declared as an array of `BingoCard`, which of the following is a correct replacement for

```
/* construct each BingoCard */
```

```
I   for (BingoCard card : players)
        card = new BingoCard();

II  for (BingoCard card : players)
        players[card] = new BingoCard();

III for (int i = 0; i < players.length; i++)
        players[i] = new BingoCard();
```

(A) I only
(B) II only
[✓ (C)] III only
(D) I and III only
(E) I, II, and III

√10. C

Suppose the characters 0, 1, ..., 8, 9, A, B, C, D, E, F are used to represent a hexadecimal (base-16) number. Here A = 10, B = 11, ..., F = 15. What is the largest base-10 integer that can be represented with a two-digit hexadecimal number, such as 14 or 3A?

(A) 32
(B) 225
(C) 255
(D) 256
(E) 272

$16^2-1$

3
16
16
96
160
256-1
255

**Go to the next page**