TINKER ACADEMY

AP Computer Science Prep (Java DS & Algo)

Spring 2015 FINAL EXAM

Welcome to the Class!

This will cover all the entire AP Computer Science Prep (Java DS & Algo) course.

The final exam has 10 questions.

You have 30 minutes to complete this quiz.

Directions

Type in 1 in the Answer Box if you think Option 1 is the correct answer
Type in 2 in the Answer Box if you think Option 2 is the correct answer
Type in 3 in the Answer Box if you think Option 3 is the correct answer
Type in 4 in the Answer Box if you think Option 4 is the correct answer

Question 1

What is the output of the following code?

```
int[] arr1 = { 0, 1, 2, 3, 4, 5};
int[] arr2 = { 0, 1, 2, 3, 4, 5};
for (int k = 0; k < arr1[4] + arr2[5]; k++)
{
    if (k % 4 ==0) {
       arr1[4] = arr2[5];
    }
    if (k % 5 ==0) {
       arr2[5] = arr1[4];
    }
}
System.out.println(Arrays.toString(arr1));
```

System.out.println(Arrays.toString(arr2));

1. [0, 1, 2, 3, 4, 5]
   [0, 1, 2, 3, 4, 5]
2. [0, 1, 2, 3, 5, 5]
   [0, 1, 2, 3, 4, 5]
3. [0, 1, 2, 3, 5, 5]
   [0, 1, 2, 3, 5, 5]
4. [0, 0, 0, 0, 0, 0]
   [0, 0, 0, 0, 0, 0]

Write your answer below

Answer

Question 2

What is the output of the following code?

```
int[] arr = { 0, 1, 2, 3, 4, 5};
for (int k = 0; k < arr.length - 1; k++)
{
    arr[k] = arr[k] + arr[k+1];
}
System.out.println(Arrays.toString(arr));
```

1. [0, 1, 2, 3, 4, 5]
2. [1, 2, 3, 4, 5, 6]
3. [0, 1, 3, 5, 7, 9]
4. [1, 3, 5, 7, 9, 5]

Write your answer below

Answer

Question 3

What is the output of the following code?

```
int[] arr = { 0, 1, 2, 3, 4, 5};
for (int k = arr.length - 1; k > 0; k--)
{
    arr[k] = arr[k] + arr[k - 1];
}
System.out.println(Arrays.toString(arr));
```

1. [0, 1, 2, 3, 4, 5]
2. [1, 2, 3, 4, 5, 6]
3. [0, 1, 3, 5, 7, 9]
4. [1, 3, 5, 7, 9, 5]

Write your answer below

Answer

Question 4

What code is expected to complete first?

A

```
int[] arr = { 0, 1, 2, 3, 4, 5};
BubbleSort sorter = new BubbleSort();
sorter.sort(arr);
```

B

```
int[] arr = { 0, 1, 2, 3, 4, 5};
InsertionSort sorter = new InsertionSort();
sorter.sort(arr);
```

1. A
2. B
3. A and B will take the same time
4. It depends

Write your answer below

Answer

Question 5

What code is expected to complete first?

A

```
int[] arr = { 5, 4, 3, 2, 1, 0};
BubbleSort sorter = new BubbleSort();
sorter.sort(arr);
```

B

```
int[] arr = { 5, 4, 3, 2, 1, 0};
InsertionSort sorter = new InsertionSort();
sorter.sort(arr);
```

1. A
2. B
3. A and B will take the same time
4. It depends

Write your answer below

Answer

Question 6

What was the "invariant" used in Bubble Sort? An "invariant" is something that always holds true in each step of the algorithm

1. The left sub array always has at least 1 data element
2. The left sub array is always completely sorted
3. The left sub array is always completely **un**sorted
4. The right array is always completely unsorted

Write your answer below

Answer

Question 7
What was the "invariant" used in Insertion Sort? An "invariant" is something that always holds true in each step of the algorithm 1. The left sub array is always sorted in increasing order 2. The left sub array is always sorted in decreasing order 3. The right array is always sorted in increasing order 4. The right array is always unsorted Write your answer below
Answer

Question 8
Your best friend decides to write a BubbleSort algorithm and runs in on an array with 10,000 items. Your friend promises to play tennis with you after the sorting is completed. Each comparison runs in 1 ms on your friends laptop. The sorting starts today (Saturday) at 05:00 pm. **The sorting is done on an array that is already fully sorted**. When is the earliest you can play tennis with your friend? You can assume the entire time of the algorithm is decided by the # of comparisons. 1. Today (Saturday) at 05:05 pm 2. Today (Saturday) at 07:00 pm 3. Tomorow (Sunday) at 07:00 am 4. Tomorrow (Sunday) at 05:05 pm Write your answer below
Answer

Question 9
Your best friend decides to write a InsertionSort algorithm and runs in on an array with 10,000 items. Your friend promises to play tennis with you after the sorting is completed. Each comparison runs in 1 ms on your friends laptop.

The sorting starts today (Saturday) at 05:00 pm. **The sorting is done on an array that is already fully sorted**. When is the earliest you can play tennis with your friend?

You can assume the entire time of the algorithm is decided by the # of comparisons.

1. Today (Saturday) at 05:05 pm
2. Today (Saturday) at 07:00 pm
3. Tomorow (Sunday) at 07:00 am
4. Tomorrow (Sunday) at 05:05 pm

Write your answer below

Answer

Question 10

How many **objects** are created in the following code

```
for (int i = 0; i < 100; i++)
{
   Object o1 = new Object();
   Object o2 = o1;
   Object o3 = o2;
}
```

1. 0
2. 100
3. 200
4. 300

Write your answer below

Answer