

2022 Cy Woods Computer Science Written Test

Note: Correct responses are based on **Java SE Development Kit 17 (JDK 17)** from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (e.g., "error" is an answer choice) and any necessary Java SE 15 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used. **For all output statements, assume that the System class has been statically imported using:**

```
import static java.lang.System.*;
```

Question 1

Which of the following is equal to 10111_2 ?

- A) M_{30} B) 16_{16} C) 123_4 D) 212_3 E) 22_{10}

Question 2

What is output by the code segment to the right?

- A) -75
B) -78
C) -74
D) -80
E) No output due to a compile error.

```
out.print(-3 + -75);
```

Question 3

What is output by the code segment to the right?(* is white space)

- A) *****+4.26 B) 4.26*****
C) -4.26***** D) 4.25*****
E) 4.26*****

```
out.printf("%-10.2f", 4.2555);
```

Question 4

What is output by the code segment to the right?

- A) wildcats
B) wilcdc
C) wild
D) wil
E) Wild

```
String str = "Wildcats";  
out.print(str.substring(0, 4));
```

Question 5

What is output by the code segment to the right?

- A) true
B) false

```
out.print(false && true ^ true);
```

<p>Question 6</p> <p>What is output by the code segment to the right?</p> <p>A) -2 B) -3 C) -3.0 D) -2.0 E) -2.5</p>	<pre>out.print(Math.round(-2.5));</pre>
<p>Question 7</p> <p>What is output by the code segment to the right?</p> <p>A) 3 B) 4 C) 0 D) There is no output due to a syntax error. E) There is no output due to a runtime error.</p>	<pre>int x = 4; byte y = 13; out.print(x % y);</pre>
<p>Question 8</p> <p>What is output by the code segment to the right?</p> <p>A) 5 5 B) 5 10 C) 3 10 D) 3 5 E) a b</p>	<pre>int a = 3; int b = 10; if(a < 5) a = Math.max(a,5); if(b > 5) b = Math.min(b,5); out.print(a + " " + b);</pre>
<p>Question 9</p> <p>What is output by the code segment to the right?</p> <p>A) 2 B) 369 C) 9 D) i*3i*3i*3 E) There is no output due to a syntax error.</p>	<pre>for(int i = 1; i <= 3;i++) out.print(i*3);</pre>
<p>Question 10</p> <p>What is output by the code segment to the right?</p> <p>A) [5, 2, 3, 4, 1] B) [5, 2, 3, 3, 1] C) [5, 2, 2, 4, 1] D) [5, 2, 4, 3, 1] E) [5, 3, 2, 4, 1]</p>	<pre>int[] nums = {5,2,3,4,1}; int temp = nums[2]; nums[3] = temp; out.print(Arrays.toString(nums));</pre>
<p>Question 11</p> <p>The contents of input.txt are as follows:</p> <p>1 2 3 four</p> <p>What is output by the code segment to the right?</p> <p>A) 6 B) 3 C) 123 D) There is no output due to a syntax error. E) There is no output due to a runtime error.</p>	<pre>Scanner f; f = new Scanner(new File("input.txt")); String sum = ""; for(int i = 0; i < 3;i++){ sum += Integer.parseInt(f.next()); } out.print(sum);</pre>

<p>Question 12</p> <p>What is output by the code segment to the right?</p> <p>A) 15 B) 10 C) 14 D) There is no output due to a syntax error. E) There is no output due to a runtime error.</p>	<pre>int sum = 0; for(int i = 1; i <= 5;i++) sum += i; out.print(sum);</pre>
<p>Question 13</p> <p>What is the correct order of operations(from left to right) for the operators listed to the right.</p> <p>A) & ^ && B) && & ^ C) & ^ && D) & && ^ E) && & ^</p>	<pre>&& & ^ </pre>
<p>Question 14</p> <p>What is output by the code segment to the right?</p> <p>A) 2138483648 B) 2148483647 C) 2137483647 D) 2138483647 E) 2147483647</p>	<pre>out.println(Integer.MAX_VALUE);</pre>
<p>Question 15</p> <p>What is output by the code segment to the right?</p> <p>A) [3, 2, 2] B) [3, 2, 3] C) [3, 3, 2] D) [2, 3, 2] E) [3, 2, 3, 2]</p>	<pre>Integer num = 3; ArrayList<Integer> al; al = new ArrayList<>(); al.add(new Integer(3)); al.add(2); al.add(3); al.add(2); al.remove(num); out.println(al);</pre>
<p>Question 16</p> <p>What is output by the code segment to the right?</p> <p>A) school B) sch00l C) SCH00L D) sch00l E) There is no output due to a syntax error.</p>	<pre>out.print("SCHOOL".toLowerCase());</pre>
<p>Question 17</p> <p>What is output by the code segment to the right?</p> <p>A) This written test is pain B) This written test is PAIN C) This written test is %S D) There is no output due to a syntax error. E) There is no output due to a runtime error.</p>	<pre>out.printf("This written test is %S","pain");</pre>

<p>Question 18</p> <p>What is output by the code segment to the right?</p> <p>A) 12345 B) 1 2 3 4 5 C) 1 4 6 8 10 D) 2 4 6 8 10 E) 246810</p>	<pre>int[] arr = {1, 2, 3, 4, 5}; Arrays.stream(arr).forEach(x -> out.print(x * 2 + " ")); Arrays.stream(arr).close();</pre>
<p>Question 19</p> <p>What is output by the code segment to the right?</p> <p>A) ba3+3a3+3a B) banana C) 3+33+3n3+3n3+3 D) ba6a6a E) There is no output due to a runtime error.</p>	<pre>String thing = "banana"; thing = thing.replaceAll("[^ab]", "3+3"); out.println(thing);</pre>
<p>Question 20</p> <p>What is output by the code segment to the right?</p> <p>A) true true B) false true C) false false D) true false E) There is no output due to a runtime error.</p>	<pre>ArrayList<Integer> al = new ArrayList<>(); al.add(127); al.add(127); al.add(128); al.add(128); out.print(al.get(0) == al.get(1)); out.println(" " + (al.get(2) == al.get(3)));</pre>
<p>Question 21</p> <p>What should replace blank <line1> to properly set a and b?</p> <p>A) this.a = a; this.b = b; B) heheheha C) a = this.a; b = this.b; D) a = b; E) a and b are properly set.</p>	<pre>public class Nitrome{ static int a; static int b; public Nitrome(int a, int b){ a = a; b = b; <line1> } public String toString(){ return "a " + "b " + a + " " + b; } }</pre>
<p>Question 22</p> <p>Assuming that <line1> has been filled correctly, what does the code segment to the right output?</p> <p>A) a b 1 2 3 B) 3 3 C) a b 0 0 D) a b 3 E) a b 1 2</p>	<pre>//////////client - runner code////////// Nitrome thing = new Nitrome(1, 2); out.println(thing);</pre>

<p>Question 23</p> <p>What is return by the call <code>recur(5)</code> ?</p> <p>A) 0 B) 221 C) 223 D) 222 E) 220</p>	<pre>public static int recur(int a){ if (a < 0){ return 1; } return 10 + recur(a - 1) + recur(a - 2); }</pre>
<p>Question 24</p> <p>What is the running time of method <code>max</code> for a <code>LinkedList</code> containing <code>N</code> items? Choose the most restrictive correct answer.</p> <p>A) $O(1)$ B) $O(N)$ C) $O(N \log N)$ D) $O(N^2)$ E) $O(N^3)$</p>	<pre>//pre: data.size() > 0 public int max(LinkedList<Integer> data){ int result = data.getFirst(); for(int i = 1; i < data.size();i++) { int val = data.get(i); if(val < result) result = val; } return result; }</pre>
<p>Question 25</p> <p>What is output by the code segment to the right using the method <code>max</code> from the previous problem?</p> <p>A) 7 B) 4 C) 6 D) 5 E) -3</p>	<pre>//////////client - runner code////////// LinkedList<Integer> list; list = new LinkedList<>(); list.add(7); list.add(4); list.add(-3); list.add(6); list.add(5); list.remove(); out.println(max(list));</pre>
<p>Question 26</p> <p>What is output by the code segment to the right?</p> <p>A) -2147483649 B) -2147483648 C) 2147483647 D) 2147483648 E) 0</p>	<pre>int a = Integer.MIN_VALUE; a--; out.print(a);</pre>

Question 27

What is output by the code segment to the right?

- A) 0
- B) 1
- C) 111
- D) There is no output due to a syntax error.
- E) There is no output due to a runtime error.

```
enum Enums
{
    A,B,C;
    private Enums()
    {
        out.print(1);
    }
}

public class MainClass{
    public static void main(
        String[] args)throws Exception
    {
        Enum en = Enums.C;
    }
}
```

Question 28

Consider the makeBigNum to the right. When n is equal to 1000 it takes 2 seconds to complete. What is the expected time for the method to complete when n is equal to 2000?

- A) 0.5
- B) 2
- C) 8
- D) 4
- E) 6

```
public String makeBigNum(int n)
{
    String result = "";
    for (int i = 0; i < n; i++) {
        result += "0";
    }
    return result;
}
```

Question 29

What is output by the code segment to the right?

- A) 212
- B) 23
- C) 38
- D) There is no output due to a syntax error.
- E) There is no output due to a runtime error.

```
out.println(Integer.parseInt("" + 212,3));
```

Question 30

What type of sort is this sort to the right?

- A) Binary sort
- B) Merge sort
- C) Quick sort
- D) Radix sort
- E) Bongo sort

```
private void merge(int[] a, int l,int r)
{
    int temp = a[l];
    a[l] = a[r];
    a[r] = temp;
}
private void Sort(int[] a, int lowI,int highI)
{
    if(lowI >= highI)
    {
        return;
    }
    int mid = a[highI];
    int leftP = lowI;
    int rightP = highI;
    while(leftP < rightP)
    {
        while(a[leftP] >= mid && leftP < rightP
)
        {
            leftP++;
        }
        while(a[rightP] <= mid && leftP <
rightP)
        {
            rightP--;
        }
        merge(a,leftP,rightP);
    }
    merge(a,leftP,highI);
    Sort(a,lowI,leftP - 1);
    Sort(a,leftP + 1,highI);
}
```

Question 31

What is the runtime of the code from #30

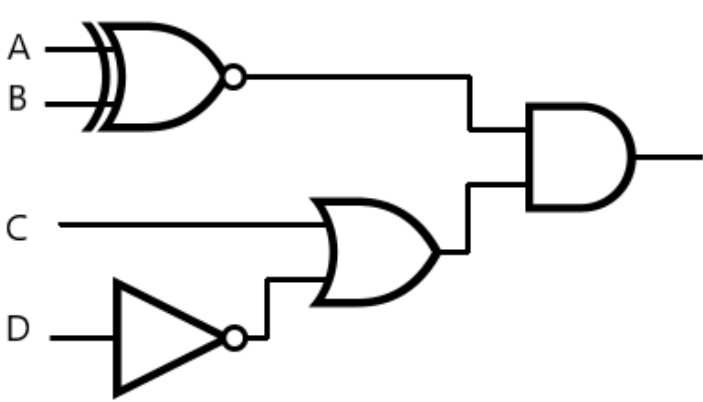
- A) $O(N \log N)$
- B) $O(N^2)$
- C) $O(N)$
- D) $O(\log N)$
- E) $O(1)$

```
//////////client-runner code//////////
int[] array = {3,3,2,1,23,4,1,7,56,74,3};
Sort(array,0,array.length - 2);
System.out.println(Arrays.toString(array));
```

Question 32

What is output by the code segment to the right?

- A) [56, 23, 7, 4, 3, 3, 2, 1, 1, 74, 3]
- B) [74, 56, 23, 7, 4, 3, 3, 2, 1, 1, 3]
- C) [1, 1, 2, 3, 3, 3, 4, 7, 23, 56, 74]
- D) [74, 56, 23, 7, 4, 3, 3, 3, 2, 1, 1]
- E) [3, 3, 2, 1, 23, 4, 1, 7, 56, 74, 3]

<p>Question 33</p> <p>What is output by the code segment to the right?</p> <p>A) January B) Jan C) February D) Feb E) 一月</p>	<pre>GregorianCalendar cal = new GregorianCalendar(2009, 1, 18); out.println(cal.getDisplayName(Calendar.MONTH, 1,Locale.US));</pre>
<p>Question 34</p> <p>What is output by the code segment to the right?</p> <p>A) 3 B) 2 C) 0 D) null E) There is no output due to a runtime error.</p>	<pre>int[] nums = new int[5]; nums[5] = 3; nums[2] = 2; out.println(nums[1]);</pre>
<p>Question 35</p> <p>What is output by the code segment to the right?</p> <p>A) $\overline{A + B} * C + \overline{D}$ B) $A * B + \overline{C + D}$ C) $\overline{A \oplus B} * C + \overline{D}$ D) $\overline{A * B} * \overline{C + D}$ E) $A \oplus B + \overline{C * D}$</p>	
<p>Question 36</p> <p>What is output by the code segment to the right?</p> <p>A) [7, 4, 6, 3, 2, 5] B) [2, 3, 6, 5, 4, 7] C) [2, 3, 4, 5, 6, 7] D) [7, 6, 5, 4, 3, 2] E) [1, 2, 3, 4, 5, 6]</p>	<pre>PriorityQueue<Integer> q = new PriorityQueue<>(Collections.reverseOrder()); q.add(4);q.add(5);q.add(6); q.add(3);q.add(2);q.add(7); out.println(q);</pre>

Question 37

What is output by the code segment to the right?

- A) [This, is, is, easy]
- B) [This, This, is, easy]
- C) [This, is, easy]
- D) [This, This, is, is, easy]
- E) There is no output due to a syntax error.

```
HashSet<String> set1;  
set1 = new LinkedHashSet<>();  
set1.add("This");  
set1.add("This");  
set1.add("is");  
ArrayList<String>  
set2 = new ArrayList<>();  
set2.add("is");  
set2.add("easy");  
set1.addAll(set2);  
out.println(set1);
```

Question 38

What is output by the code segment to the right?

- A) nothingsuspiciousaboutthisproblem
- B) NothingSuspiciousAboutThisProblem
- C) NOthingSuspiciOusAboutThisPrOblem
- D) NOTHINGSUSPICIOUSABOUTTHISPROBLEM
- E) no output due to an error

```
out.println("NothingSuspiciousAboutThisProblem  
");
```

Question 39

How many edges are in a complete undirected graph that contains 10 vertices? Write your answer in the blank provided on the answer document.

Question 40

What is $a + b$ in base 4 after the operation below was completed.

```
int a = 21;  
int b = 17;  
a = a ^ b;  
b = b ^ a;  
a = a ^ b;
```