

University Interscholastic League

Computer Science Competition 2005-06

SAC PRACTICE TEST

- Remember that calculators are NOT permitted.

QUESTION 1	
<p>What is the number AC_{16} when converted to binary?</p> <p>A. 10011100_2 B. 10011010_2 C. 10101100_2 D. 10101010_2 E. 10101011_2</p>	
QUESTION 2	<p>What is the value of $A[3]$ after executing the code to the right?</p> <p>A. 3 B. 4 C. 5</p> <p>D. 12 E. 15</p> <pre>int [] A = {1, 2, 3, 4, 5}; int [] B; B = A; B[3] = 12;</pre>
QUESTION 3	<p>What is output by the code to the right?</p> <p>A. 128 B. 100 C. 64</p> <p>D. 7 E. Nothing</p> <pre>int i = 1; do { i = i*2; } while (i<100); System.out.print(i);</pre>
QUESTION 4	
<p>If the items 15, 27, and 12 are pushed onto a stack in that order, in what order will they be returned by popping the stack?</p> <p>A. 15, 27, 12 B. 12, 27, 15 C. 12, 15, 27 D. 27, 15, 12 E. 27, 12, 15</p>	
QUESTION 5	<p>Which of the following replaces $\langle *1 \rangle$ in the code to the right to check whether the character at position i in string s is a digit?</p> <p>A. $s.charAt(i).isDigit()$</p> <p>B. $Character.isDigit(s.charAt(i))$</p> <p>C. $s.isDigit(i)$</p> <p>D. $s.charAt.isDigit.i$</p> <p>E. More than one of these</p> <pre>public static int process(String s) { int total = 0; for (int i=0; i<s.length(); ++i) { if ($\langle *1 \rangle$) total += s.charAt(i)-'0'; } return total; }</pre>
QUESTION 6	<p>What replaces $\langle *1 \rangle$ in the code to the right to indicate that $main()$ does not return anything?</p> <p>A. void B. zero</p> <p>C. catch D. return</p> <p>E. Nothing</p> <pre>public class Test { public static $\langle *1 \rangle$ main(String[] args) { System.out.print("Hello, world!"); } }</pre>

QUESTION 7

Suppose `Contact` has a public method called `getName()` which returns the name of a contact. Which of these returns the name of a properly declared and initialized `Contact c`?

- A. `c.name.getName` B. `c[0]`
- C. `c.getName()` D. `getName(c)`
- E. `getName(c, Name)`

```
// A class to represent a contact. Assume
// the classes Name, PhoneNumber, and
// Address exist.
```

```
public class Contact {

    // constructors and methods not shown

    private Name name;
    private PhoneNumber home;
    private PhoneNumber office;
    private PhoneNumber cell;
    private PhoneNumber fax;
    private Address address;
}
```

QUESTION 8

Which of these creates an `ArrayList` to which only `Contact` objects can be added?

- A. `ArrayList book();`
- B. `ArrayList book = new ArrayList();`
- C. `ArrayList<Contact> book;`
- D. `ArrayList book =`
`new ArrayList(Contact);`
- E. `ArrayList<Contact> book =`
`new ArrayList<Contact>();`

QUESTION 9

Suppose `book` is declared correctly to be an `ArrayList` which holds objects of type `Contact`. Which of these sets `Contact c` to be the item at index 3 in `book`?

- A. `c = book.get(3)`
- B. `c = (Contact) (book.get(3))`
- C. `c = ((Contact)book).get(3)`
- D. Both A and B
- E. A, B, and C

QUESTION 10

What replaces `<*1>` in the code to the right to make `employeeCount` a class variable shared by all instances of `Employee` and hidden from other classes?

- A. `final` B. `static`
- C. `private final` D. `private static`
- E. `private final static`

```
public class Employee {
    <*1> int employeeCount = 0;
    // other constants and methods
    // not shown
}
```

<p>QUESTION 11</p> <p>What is output by the call <code>output("ctest")</code>?</p> <p>A. <code>ctest</code> B. <code>cteststestteststt</code> C. <code>ctestctestcstecstcsc</code> D. <code>ctestctestctestctestctestctest</code> E. Nothing</p>	<pre>public static void output(String s) { int len = s.length(); for (int i=len; i>0; --i) { System.out.print(s); s = s.substring(1); } }</pre>
<p>QUESTION 12</p> <p>What is returned by <code>mixer(0,0,2)</code>?</p> <p>A. -2 B. 4 C. -6 D. 8 E. -10</p>	<pre>public static int mixer(int x, int y, int z) { x += y + z; y -= x + z; z *= x + y; return x + y + z; }</pre>
<p>QUESTION 13</p> <p>Which of these describes the rent of an apartment computed using method <code>computeRent()</code>?</p> <p>A. Proportional to the number of bathrooms, with an additional charge for each bedroom B. Proportional to the number of square feet, with an additional charge for each bathroom C. Proportional to the number of bedrooms, with an additional charge for each square foot D. Proportional to the number of square feet, with an additional charge for each bedroom and bathroom E. Fixed at \$1000</p>	<pre>public class Apartment { // public three argument constructor to // initialize private data not shown // returns monthly rent in dollars public int computeRent(double x, int y) { return (int)(squareFeet*x + numBathrooms*y); } private int numBedrooms; private int numBathrooms; private int squareFeet; }</pre>
<p>QUESTION 14</p> <p>If <code>Apartment a</code> has 1000 square feet, two bedrooms, and three bathrooms, what is returned by the method call <code>a.computeRent(.75, 100)</code>?</p> <p>A. 650 B. 750 C. 850 D. 950 E. 1050</p>	
<p>QUESTION 15</p> <p>What is output by the code to the right when <code>x</code> is 18?</p> <p>A. A B. B C. C D. D E. E</p>	<pre>switch(x % 4) { case 0: System.out.print("A"); break; case 1: System.out.print("B"); break; case 2: System.out.print("C"); break; case 3: System.out.print("D"); break; default: System.out.print("E"); }</pre>

<p>QUESTION 16</p> <p>Which of these is a valid declaration and initialization?</p> <p>A. <code>Cat c = new Animal();</code> B. <code>Animal a = new Cat();</code> C. <code>Cat c();</code> D. <code>Animal a();</code> E. More than one of these</p>	<pre>public class Animal { public Animal() {} // other methods and data not shown } public class Cat extends Animal { public Cat() {} // other methods and data not shown }</pre>
<p>QUESTION 17</p> <p>What is returned by <code>recurse(7)</code>?</p> <p>A. 7 B. 21 C. 28 D. 5040 E. Does not terminate</p>	<pre>public static int recurse(int i) { if ((i == 0) (i == 1)) return 1; else return recurse(i-1) + recurse(i-2); }</pre>
<p>QUESTION 18</p> <p>What replaces <code><*1></code> in the code to the right to make a loop that prints all elements of <code>s</code>?</p> <p>A. <code>Iterator i : TreeSet s</code> B. <code>Integer i : Set s</code> C. <code>Integer Iterator Set i s</code> D. <code>Iterator i : s</code> E. <code>Integer i : s</code></p>	<pre>Set<Integer> s = new TreeSet<Integer>(); // code to add elements to s not shown for (<*1>) System.out.print(i);</pre>
<p>QUESTION 19</p> <p>How many <code>*</code>'s are output by the code to the right when <code>n</code> has the value 10?</p> <p>A. 81 B. 90 C. 100 D. 110 E. 121</p>	<pre>for (int i=0; i<n; ++i) for (int j=0; j<n; ++j) System.out.print('*');</pre>
<p>QUESTION 20</p> <p>What is the running time of the code to the right? Choose the most restrictive correct answer.</p> <p>A. $O(1)$ B. $O(\log n)$ C. $O(n)$ D. $O(n \log n)$ E. $O(n^2)$</p>	