

University Interscholastic League

Computer Science Competition 2003-04

JAVA PRACTICE QUESTIONS – SET 2

- Remember that calculators are NOT permitted for this year's contests.

QUESTION 1

$$1001_2 + 101_2 =$$

- A. 1111_2 B. 1110_2 C. 1101_2 D. 10000_2 E. None of these

QUESTION 2

If `int x` has value 4 and `int y` has value 3, what is the value of this expression?

$$(x^y) + (y \ll x)$$

- A. 10 B. 11 C. 27 D. 55 E. None of these

QUESTION 3

What does the function `mystery()` do?

- A. Quicksort B. Sequential search
 C. Selection sort D. Insertion sort
 E. None of these

```
public static void
    mystery(int[] v) {
    int len=v.length;
    for (int i=0; i<len-1; ++i) {
        int min=i;
        for (int j=i+1; j<len; ++j)
            if (v[j]<v[min]) min=j;
        int temp=v[i];
        v[i]=v[min];
        v[min]=temp;
    }
}
```

QUESTION 4

Suppose the array below is passed to `mystery()`. What will it look like after the first iteration of the outer `for` loop is complete?

13	27	18	15	10	9	12	12
----	----	----	----	----	---	----	----

A.

13	27	18	15	10	9	12	12
----	----	----	----	----	---	----	----

B.

10	12	12	9	13	15	18	27
----	----	----	---	----	----	----	----

C.

9	10	12	12	13	15	18	27
---	----	----	----	----	----	----	----

D.

9	27	18	15	10	13	12	12
---	----	----	----	----	----	----	----

- E. None of these

QUESTION 5

What is the running time of the code to the left where `n` is the length of `v`? Choose the smallest correct answer.

- A. $O(n)$ B. $O(n \log n)$
 C. $O(n^2)$ D. $O(n^3)$
 E. None of these

QUESTION 6

Which of the following declares a reference to a `Clock` object, and builds a `Clock` object with the time 6:30 am?

- A. `Clock c(6,30,false);`
- B. `Clock c = new Clock(6,30,true);`
- C. `new Clock(6,30,true);`
- D. `Clock c = Clock(6,30,true);`
- E. None of these

QUESTION 7

Which of the following expressions will set `Clock d` to be one hour and forty minutes later than `Clock c`?

- A. `d = c+1:40;`
- B. `d = c + Clock(1,40);`
- C. `d = c + Clock(1,40,true);`
- D. `d = c.add(1:40);`
- E. None of these

QUESTION 8

Suppose we want to add a member function to the `Clock` class that returns a `String` representing the time, with a parameter telling whether to use twelve hour or twenty four hour time. Which of the following methods could be added to the `Clock` class to do this?

- A. `public String toString(boolean twelvehour);`
- B. `public String toString(boolean twelvehour);`
- C. `public toString(String s, boolean twelvehour);`
- D. `public toString(String s, boolean twelvehour);`
- E. More than one of these

QUESTION 9

What is returned by the function call `middle("potato")`?

- A. "potato" B. "pota"
- C. "ta" D. "otat"
- E. None of these

```
public class Clock {
    public Clock() {
        this(12,0,true);
    }

    public Clock(int hours,
                 int minutes,
                 boolean morning) {
        if (hours<=0 || hours>12
            || minutes<0
            || minutes>59) {
            throw new
                IllegalArgumentException();
        }
        else {
            m=minutes;
            h=(hours==12)?0:hours;
            if (!morning) h+=12;
        }
    }

    public Clock add(int minutes) {
        Clock c = new Clock();
        c.m = (m+minutes)%60;
        if (m+minutes>=60)
            c.h=(h+1)%24;
        else
            c.h=h;
        return c;
    }

    public Clock add(int hours,
                    int minutes) {
        Clock c = add(minutes);
        c.h=(c.h+hours)%24;
        return c;
    }

    // Time stored in 24 hour mode
    private int h, m;
}
```

```
public static String
    middle(String s)
{
    return s.substring(1,
                      s.length()-2);
}
```

QUESTION 10

Which of these could replace **<*1>** in the code to the right to define class constants X and O set to 1 and -1, respectively?

- A. `private static int X = 1;
private static int O = -1;`
- B. `private static final X:1;
private static final O:-1;`
- C. `private static final int X = 1;
private static final int O = -1;`
- D. `private static int X = 1 final;
private static int O = -1 final;`
- E. None of these

For the remaining questions, assume **<*1>** is filled in correctly.

QUESTION 11

After a TicTacToe object is constructed, what is the value of its data member `board[1][1]`?

- A. undefined
- B. 0
- C. null
- D. 1
- E. None of these

QUESTION 12

What is output by the following?

```
TicTacToe t = new TicTacToe();
t.makeMove(1,1);
t.makeMove(2,1);
t.makeMove(1,2);
t.display();
```

- A. `X|O|`
`-+-+-`
`X| |`
`-+-+-`
`| |`
- B. `X|X|`
`-+-+-`
`O| |`
`-+-+-`
`| |`
- C. `| |`
`-+-+-`
`|X|O`
`-+-+-`
`|X|`
- D. `| |`
`-+-+-`
`|X|X`
`-+-+-`
`|O|`
- E. None of these

```
public class TicTacToe{
    public TicTacToe() {
        board = new int[3][3];
        turn = X;
    }

    public void makeMove(int i,
                        int j){
        board[i][j]=turn;
        turn=((turn==X)?O:X);
    }

    public void display(){
        for (int i=0; i<3; ++i) {
            System.out.println(""+
                convert(board[i][0])+'|'+
                convert(board[i][1])+'|'+
                convert(board[i][2]));
            if (i!=2)
                System.out.println("-+-+-");
        }
    }

    private static char
        convert (int player) {
        if (player==X)
            return 'X';
        else if (player==O)
            return 'O';
        else
            return ' ';
    }

    <*1>

    private int board[][];
    private int turn;
}
```

QUESTION 13

Which of these function calls will return the value 26?

- A. `sum("26")`
- B. `sum("12 7 7")`
- C. `sum("27 -1 -4 2 2")`
- D. `sum("10\t15\n 1")`
- E. All of these

```
public static int sum(String s) {
    StringTokenizer st =
        new StringTokenizer(s);
    int total=0;
    while (st.hasMoreTokens())
        total += Integer.parseInt(
            st.nextToken());
    return total;
}
```

QUESTION 14

What is returned by the function call `process("abc Xy Z ")`?

- A. `"abc Xy Z"`
- B. `"abcxyz"`
- C. `"abcXyZ"`
- D. `"ABCXYZ"`
- E. None of these

```
public static String
    process(String s) {
    String answer="";
    for(int i=0; i<s.length(); ++i){
        if (Character.isWhitespace
            (s.charAt(i)))
            continue;
        else answer +=
            Character.toUpperCase
            (s.charAt(i));
    }
    return answer;
}
```

QUESTION 15

Suppose that `Address` is a user-defined class which holds addresses. Which of the following built-in classes can be used to make an address book, matching each person's name (stored as a `String`) with their address?

- A. `TreeMap`
- B. `Random`
- C. `ArrayList`
- D. `StringBuffer`
- E. None of these

COMPUTER SCIENCE ANSWER KEY

JAVA PRACTICE QUESTIONS SET 2

- | | | | |
|-----|---|-----|---|
| 1. | B | 11. | B |
| 2. | D | 12. | D |
| 3. | C | 13. | E |
| 4. | D | 14. | D |
| 5. | C | 15. | A |
| 6. | B | | |
| 7. | E | | |
| 8. | B | | |
| 9. | E | | |
| 10. | C | | |