

CSci A201/A597
Final Exam, Spring 1999
5/4/99

Name: _____

Username: _____

Circle the name of your AI (teacher)

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Instructions:

- This is a open book exam. You may use any book, notes, or printouts of web pages you want.
- You may use a calculator if necessary (although I doubt it will be). But the use of laptop computers is not permitted.
- If you have any questions during the exam, please feel free to ask.
- There are total 20 questions on this exam, all of which are multiple choice type question. All questions carry equal number of points (2).
- **Filling in the scantron sheet** YOU SHOULD NOT WRITE YOUR FULL NAME in your scantron sheet. In the first part where it says NAME, simply write and bubble in your username. Skip the birth date, but write and bubble in your student ID number in the appropriate place. Skip the special codes, sex and grade stuff.
- To answer the multiple choice questions, fill in the appropriate circles in the scantron sheet. Each question has only one correct response. If you feel multiple answers match a question, mark the one which is closer. If you do this, make sure you explain your reasoning clearly next to the question in the question paper (not on the scantron sheet).
- You have exactly two hours to complete this exam.

Questions	Points	Score
Total	40	

For the following multiple-choice questions, there can only be one answer unless otherwise mentioned. Indicate the correct answer by filling in the circle corresponding to the answer.

1. `String name = "Fred";`

The above line of code does which of the following things?

- (a) Declares a new variable
- (b) Allocates memory for the storage of 4 characters
- (c) Initializes the variable called "name"
- (d) All of the above
- (e) None of the above

Answer: D

2. What do you need to do to get the following code snippet to compile?

```
int[] x = new int[10];
for(int i = 0; i<=x.length(); i++)
    x[i]=5;
```

- (a) `i<=x.length()` should be `i < x.length()`
- (b) `x.length()` should be `x.length`
- (c) `i++` should be `i = i + 1`
- (d) There needs to be brackets around `x[i]=5`
- (e) It will compile - there is no compilation error.

Answer: B

3. What is the default constructor of a class?

- (a) the first constructor that is defined
- (b) the constructor that initializes the class variables
- (c) the constructor that is named "default"
- (d) the constructor that takes no parameters
- (e) None of the above

Answer: D

4. Suppose we have two classes: Person and Student where Student inherits Person. Then we have the following code:

```
Person p = new Person(); /* line 1 */
Student s = new Student(); /* line 2 */
p = s; /* line 3 */
s = p; /* line 4 */
```

Which of the following will cause a compile-time error?

- (a) line 3
- (b) line 4
- (c) Both lines 3 and 4
- (d) Neither lines 3 nor 4
- (e) Cannot say without looking at the actual classes

Answer: B

5. What is the value of “sum” after the following code executes:

```
int sum=0;
for (int i=0; i<10; i++)
    sum += i;
```

- (a) 45
- (b) 55
- (c) 36
- (d) 0
- (e) 10

Answer: A

6. What output will the following code produce?

```
class ThisIsASuperclass
{
    public ThisIsASuperclass()
    {
        System.out.print(" 0");
    }

    public void draw()
    {
        System.out.print(" 1");
    }
}

class ThisIsASubclass extends ThisIsASuperclass
{
    public ThisIsASubclass()
    {
        System.out.print(" 2");
    }

    public void draw()
    {
        System.out.print(" 3");
        super.draw();
    }

    public void draw(int number)
    {
        super.draw();
        draw();
    }
}

public class ThisIsTheMainClass
{
    public static void main(String[] args)
    {
        ThisIsASubclass Obj1=new ThisIsASubclass();
        Obj1.draw();
        Obj1.draw(4);
        ((ThisIsASuperclass)Obj1).draw();
    }
}
```

- (a) 0 3 1 1 3 1
- (b) 0 2 3 1 1 3 1 3 1
- (c) 2 3 1 1
- (d) 3 1 1 4 3
- (e) Nothing, the code contains an error

Answer: B

7. Trace through the following code (it may have problems, but it compiles):

```
int i, j;
int sum = 0;
int numStudents = 3;
int numAssignments = 5;
double[][] labGrades = new double[numStudents][numAssignments];
double[] averages = new double[numStudents];

// Initialize grade array in an arbitrary manner...
// Students perform according to their position in the class!!
for (i=0; i<numStudents; i++) {
    for (j=0; j<labGrades[i].length; j++)
        labGrades[i][j] = 40*i;
}

// Now calculate each student's average:
for (i=0; i<numStudents; i++)
{
    for (j=0; j<labGrades[i].length; j++)
        sum += labGrades[i][j];
    averages[i] = sum / numAssignments;
}
```

What is the value of averages[2] after the above code executes?

- (a) 120.0
- (b) 100.0
- (c) 80.0
- (d) 0.0
- (e) 40.0

Answer: A

8. Given the following function:

```
public static void swap(int a, int b)
{
    int tmp;
    tmp = a;
    a = b;
    b = tmp;
}
```

What would be the effect of the following function call?

```
int x = 10; int y = 20;
swap(x, y);
```

- (a) It exchanges the values of x and y.
- (b) Nothing.
- (c) It compares x and y.
- (d) It sets the global variable "tmp" to the same value as the parameter "a".
- (e) It sets the two parameters to the same value.

Answer: B

9. What does the following code print (there are no compilation errors)?

```
int i;
String alphabet = "abcdefghijklmnopqrstuvwxyz";
for (i=0; i<20; i++)
{
    for (i=0; i<20; i+=5)
    {
        System.out.print(" "+alphabet.charAt(i));
    }
}
```

- (a) a b c d e f g h i j k l m n o p q r s t
- (b) a f k p
- (c) a a a a a
- (d) e j o t
- (e) i h a t e t h i s

Answer: B

10. Which of the following is NOT a reason for using functions?

- (a) They make the program run faster.
- (b) They make code more reusable.
- (c) They make code easier to read.
- (d) They group together a logical block of code.
- (e) They make it easier to make revisions to the program.

Answer: A

11. What does the following program do (you can assume that there are no compilation errors)?

```
int x = 10, y = 5, z = -2;
boolean done = false;
int[] nums = { 2, 4, 6, 8, 10}
for (int i = 0; i < 5 && done == false; i++) {
    if (nums[i] < y) {
        System.out.println(nums[i] * y);
    }
    else if (nums[i] < x) {
        System.out.println((nums[i] * x));
        done = true;
    }
    else
        System.out.println(nums[i]);
}
```

- (a) 2 4 6 8 10
- (b) 20 40 60 80 100
- (c) 10 40
- (d) 10 20 30 80
- (e) 10 20 60

Answer: E

12. Given the following array, which loop will NOT print out the contents of the array?

```
String[] fruit={"apple", "orange", "pear", "pineapple", "tomato"}
```

- (a)

```
for (int i=1; i<=fruit.length; i++) {  
    System.out.print(fruit[i-1]+" ");  
}
```
- (b)

```
for (int i=0; i<fruit.length; i++) {  
    System.out.print(fruit[i]+" ");  
}
```
- (c)

```
for (int i=5; i>=0; i--) {  
    System.out.print(fruit[i]+" ");  
}
```
- (d)

```
int i=0;  
while (i!=fruit.length) {  
    System.out.print(fruit[i]+" ");  
    i++;  
}
```
- (e)

```
int i=fruit.length-1;  
while (i>-1) {  
    System.out.print(fruit[i]+" ");  
    i--;  
}
```

Answer: C

13. Which is most likely definition of the function header for printRow, given the following code snippet?

```
int[] [] image={{0,0,1,0,0},  
               {0,1,0,1,0},  
               {1,0,0,1,0},  
               {0,1,0,1,0},  
               {0,0,1,0,0}};  
printRow(image[0]);
```

- (a)

```
public static void printRow(int[] [] data) {
```
- (b)

```
public static int printRow(int[] [] image) {
```
- (c)

```
public static void printRow(int[] column) {
```
- (d)

```
public static int[] printRow() {
```
- (e)

```
public static void printRow() {
```

Answer: C

14. What is printed as the result of the following code:

```
int[] a={1, 4, 2, 3, 5};  
int[] b={2, 1, 4, 5, 3};  
System.out.print(a[b[a[3]]]);
```

- (a) 3
- (b) 4
- (c) 5
- (d) Code contains a syntax error
- (e) Code contains a runtime error

Answer: E

15. What would be the result of the following computation?

```
double a=3/(18%4);
```

- (a) 1.5
- (b) 1.0
- (c) 0.666666666667
- (d) 4.166666666667
- (e) There will be a runtime error.

Answer: B

16. What would be the output of the following code? [Hint: you may want to draw out a table with the i, j value pairs that the inner loop will have at each iteration]

```
int i; int j;
for (i=0; i<=7; i++)
  for (j=3; j>1; j--)
    if (i%j==0)
      System.out.print(i+j+" ");
```

- (a) 3 2 4 6 6 9 8
- (b) 3 2 4 3 5 4 6 5 7 6 8 7 9 8 10 9
- (c) 0 3 0 2 2 2 3 3 4 2 6 3 6 2
- (d) Nothing, the code contains an error
- (e) 3 6 9 2 4 6 8

Answer: A

17. You have to write a function that computes the average of the final exam scores of the students in the class and that prints the highest score in the final. What parameters will the function take and what will be the return value(s)? You may assume that the size of the array is exactly the number of students.

- (a) Parameters: the grades, Return: the average
- (b) Parameters: the grades, the number of students, Return: the average, the highest score
- (c) Parameters: the grades, the average, the number of students, Return: the average
- (d) Parameters: the grades, the average, the number of students, Return: the average, the name of the student with the highest grade
- (e) Parameters: the grades, Return: none

Answer: A (E is also permissible)

18. You have to create a set of classes to describe the characteristics of the following: vehicles, cars, ships, planes, sedans, bicycles, cargo planes, warships. How many superclasses (that have at least one subclass) do you need to design for this task?
- (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
 - (e) 5

Answer: D (A is vaguely permissible - partial credit)

19. Which of the following is false?
- (a) We cannot have two instances of the same class
 - (b) We cannot have two functions or methods with the same name, even if they have different argument types
 - (c) We cannot access a variable declared inside a class from outside the class if it is declared as public
 - (d) If we define a method in a subclass with the same name and arguments as a method in the superclass, we cannot call the superclass function from within the subclass
 - (e) All of the above

Answer: E

20. Consider the following code (which compiles):

```
int i, numEmployees = 10;
double[] employeeSalaries = new double [numEmployees];
String[] employeeNames = new String [numEmployees];

// Initialize the arrays
for (i=0; i<numEmployees; i++)
{
    employeeSalaries[i] = 0;
    employeeNames[i] = "";
}
```

What Java construct/concept/idea below from A201 could be used to improve this?

- (a) An “if-block” could be used to prevent array overflow.
- (b) An “Employee class” could be created to reduce the number of arrays.
- (c) A “function” could be used to declare the array variables.
- (d) A “file” could be used to specify the code ordering.
- (e) The above code is “optimal” and cannot be improved in any way.

Answer: B