

CSci A201/A597
Midterm 2 SOLUTIONS, Spring 1999
4/07/99

Name: _____

Username: _____

Circle the name of your AI (teacher)

Sara Yuming Chris Robert Haiyan Steve

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 18 questions on this exam. 16 multiple choice, and 2 short-answer type. All multiple-choice questions carry 2 points, and all short-answer type questions carry 4 points.
- **Filling in the scantron sheet** You do not need to 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
1-16	32	
17	4	
18	4	
Total	40	

For the following multiple-choice questions, the answer is indicated using a (*) next to the correct item.

1. What is the difference between a function in an application (the main class) and a function in an applet?

- (a) In an applet the word "static" needs to be included in the header.
- (b) There can be more than one return type in an application.
- (c) The only return type in an applet is void.
- (d) (*) In an application the word "static" needs to be included in the header.
- (e) No difference

2. What is the output of the following program segment?

```
int i;
for(i=0; i<5; i++){
    if(i == 5)
        System.out.println("i has reached 5");
}
System.out.println("Value of i now is: "+i);
```

- (a) i has reached 5
Value of i now is: 5
- (b) Value of i now is: 4
- (c) (*) Value of i now is: 5
- (d) i has reached 5
Value of i now is: 4
- (e) i has reached 5
Value of i now is: 6

3. What does the following program do?

```
int b[] = new int[12];
for(int i=0; i<=b.length; i++)
    b[i] = 1;
```

- (a) Goes into an infinite loop
- (b) Assigns all elements in the array to 1
- (c) Assigns only the first element in the array to 1
- (d) Gives a compilation error
- (e) (*) Gives a runtime error

4. Given the following array:

```
int[] nums = { 10, 8, 6, 4, 2, 0 };
```

What output will the following code produce?

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

- (a) the for loop is incorrect, the code won't work
- (b) 10 8 6 4 2 0
- (c) (*) 10 8 6 4
- (d) 10 8 6 4 2
- (e) 10 8 6

5. What output will the following code give?

```
int[] nums = { 1, 2, 3, 4, 5, 6};
String[] names = {"Yuming", "Sara", "Haiyan", "Steve", "Scott", "Chris"};

for (int count = 0; count < 5; count++) {
    if (names[count].charAt(3) == 'i') {
        System.out.println("Your AI is: " + nums[count]);
    }
}
```

- (a) Your AI is: 3
- (b) Your AI is: Steve
- (c) Your AI is: 0
- (d) Your AI is: 6
- (e) (*) Your AI is: 1

6. What are the values of a, b, c at the end of the following program?

```
public class ExamQuestion
{
    public static void main(String args[])
    {
        int a=2, b=5, c;
        c=squareIt(a);
        b=squareIt(b);
    }

    public static int squareIt(int x) { return x*x; }
}
```

The values of a, b, c respectively are:

- (a) 4, 5, 4
- (b) (*) 2, 25, 4
- (c) 4, 25, undefined
- (d) 2, 5, 4
- (e) Cannot determine, since the code has an error and will not run

7. What are the final values of i and sum after this code fragment executes?

```
int i, number=7;
int sum=0;
for (i=79; i>number; i-=number)
{
    sum++;
}
```

- (a) i=0, sum=79
- (b) (*) i=2, sum=11
- (c) i=8, sum=10
- (d) i=1, sum=7
- (e) Can't execute the code - it contains an error

8. Given the following code segment:

```
-----  
    System.out.print(i + " ");  
}
```

What code would you place in the blank line above to produce the result "25 26 27 28"?

- (a) (*) for (int i=25; i<=28; i++) {
 - (b) for (int i=24; i<28; i=i+1) {
 - (c) for (int i=25; i<28; i++) {
 - (d) for (int i=25; i<=28; i--) {
9. Which of the following retrieves the last element in an array (x) of undetermined number of elements, and stores it in the last element of a second array (y) with 10 elements?
- (a) y[10]=x[x.length];
 - (b) y[9]=x[x.length];
 - (c) y[10]=x[x.length-1];
 - (d) (*) y[9]=x[x.length-1];
 - (e) Cannot do it unless we know the number of cells in x
10. What does the following program do?

```
public class T3{  
  
    public static void main(String arg[]){  
        String s="test";  
        char[] c= new char[4];  
        for(int j=1; j<=s.length();j++)  
            { c[j-1]=s.charAt(j); }  
  
        for(int i=0; i< c.length; i++)  
            { System.out.println(c[i]);  
            }  
    }  
}
```

- (a) (*) String out of bound error
- (b) Array out of bound error
- (c) both
- (d) no error, print out "test"
- (e) no error, print out "est "

11. What is the output of the following program?

```
public class T4{
    public static void main(String args[])
    { f(); b(); g(); }
    public static void b()
    { f(); f(); }
    public static void f()
    { g(); }
    public static void g()
    { System.out.print("H"); }
}
```

- (a) HH
- (b) HHH
- (c) this program has error, cannot be compiled
- (d) (*) HHHH (intended answer. However, everybody received credit for this question)
- (e) H

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

```
int i=3;
for (i=0;i!=9;i++)
{
    System.out.print(" "+i);
    i=i+1;
}
```

- (a) 3 4 5 6 7 8
- (b) 0 1 2 3 4 5 6 7 8
- (c) 0 2 4 6 8
- (d) i i i i i i i i
- (e) (*) The loop is infinite

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

```
int i=0;
int j=0;
String weird="This is a weird string";
while (i<weird.length())
{
    if (weird.substring(i,i+1).equals("i"))
    {
        j=scramble(i);
        System.out.println(j+" ");
    }
    i=i+1;
}
public int scramble(int k)
{
    if (k%2==0) return k;
    else return k+1;
}
```

- (a) 2 4 10 16
- (b) 0 2 2 4 4 6 6 8 8 10 10 12 12 14 14 16 16 18 18 20 20 22
- (c) 3 5 13 19
- (d) (*) 2 6 12 20
- (e) Goes into an infinite loop

The following code attempts to take a string and converts it into an array of characters. There are a couple of places of missing code in the program, marked A and B. What should go in these blanks?

```
int i=0;
int index=1;
String test=Console.in.readLine();
char[] someWords=new char[ ___A___ ];

for (_____B_____ )
{
    someWords[index]=test.charAt(index);
}
```

14. What would be the best thing to put in the blank marked “A”?

- (a) 80
- (b) 60
- (c) (*) `test.length()`
- (d) `someWords.length`
- (e) Can't tell without knowing what the user typed in

15. What would be the best thing to put in the blank marked “B”?

- (a) `i=0; i<test.length(); i++`
- (b) (*) `index=0; index<someWords.length; index++`
- (c) `i=1; i<=test.length(); i=i+1`
- (d) `i=0; i<16, i++`
- (e) `index==0; index>0; index--`

16. What would be one advantage of an array of characters over a String?

It would be easier to write a program that (compared with the same operation in strings):

- (a) prints the array of characters
- (b) gets a substring of an array of characters
- (c) (*) reverses the array of characters
- (d) All of the above
- (e) None of the above

17. The following code fragment won't compile. There are SEVERAL compile-time (syntax) errors. What are they? Fix them. You may rewrite the erroneous line with the line number in the space below.

```
1   boolean correct;
2   int myNumber = randomInt(1,5);
3   while (!correct)
4   {
5       System.out.print("Please enter your guess: ");
6       guess = Console.in.readInt();
7       if (guess = myNumber)
8           boolean correct = true;
9       System.out.print("That is correct! Good job!!")
10      else if (guess < myNumber)
11          boolean correct = false;
12          System.out.print("Your guess was too low. Try again.");
13      else if (guess > myNumber)
14          boolean correct = false;
15          System.out.print("Your guess was too high. Try again.");
16  }
17  System.out.println("FINALLY! You guessed it!");
```

Solution:

```
1   boolean correct = false;
2   int myNumber = Numeric.randomInt(1,5);
3   while (!correct)
4   {
5       System.out.print("Please enter your guess: ");
6       int guess = Console.in.readInt();
7       if (guess == myNumber) {
8           correct = true;
9       System.out.print("That is correct! Good job!!");
9a      }
10      else if (guess < myNumber) {
11          correct = false;
12          System.out.print("Your guess was too low. Try again.");
12a     }
13      else if (guess > myNumber) {
14          correct = false;
15          System.out.print("Your guess was too high. Try again.");
15a     }
16  }
17  System.out.println("FINALLY! You guessed it!");
```

18. Rewrite the following code so that it uses a for loop instead of a while loop. Then describe what the output of the program would be.

```
double i=64.5;
while (i>=0.5)
{
    System.out.println("i currently is: "+i);
    i=i/2;
}
```

Solution:

```
double i;
for (i=64.5; i >= 0.5; i = i/2) {
    System.out.println("i currently is: "+i);
}
```

The output of the program will be:

```
i currently is: 64.5
i currently is: 32.25
i currently is: 16.125
i currently is: 8.0625
i currently is: 4.03125
i currently is: 2.015625
i currently is: 1.0078125
i currently is: 0.50390625
```

A correct answer for the above question say that the loop will repeat 8 times, each time 64.5 is divided into two and stops when the value of i becomes less than .5 (i.e., actual calculations of the above numbers is not necessary).