

CSE 20

Sample Midterm Answers

Time: 50 minutes

Name

Section (or TA):

ANSWERS

The following precedence table is provided for your use:

Precedence of Operators
()
- (unary), !, ++, --
*, /, %
+, - (binary)
<, <=, >, >=
=, !=
&&
=, +=, -=, *=, /=, %=
Otherwise left to right

Total Possible Points = 200

1. Potpourri (40 pts)

1(a). (10 pts) We want the following output

```
Hi, I interviewed Anomis.
She likes to play Golf.
Her weight in lbs is 22.
```

Fill in the missing code to get the above output using variables *kg* and *hobby*:

```
int kg = 10; // 1 kg = 2.2 lbs
String hobby = "Golf";

System.out._println__("Hi, " + "I interviewed Anomis." );

System.out._print______("She likes to play ");

System.out.println( hobby );

System.out._println______("Her weight in lbs is " + (int)(kg * 2.2) + "." );
```

1(b). (20 pts) Match the following statements (i-v) to the outputs (A-J) they produce. **Note: that there are no duplicate answers** ('A' has the value 65)

- | | | |
|-------|---|-------------|
| (i) | System.out.println("OUTPUT is " + (char) ('A' + 2)); | _____C_____ |
| (ii) | System.out.println("OUTPUT is " + (char) 'A' + 2); | _____J_____ |
| (iii) | System.out.println("OUTPUT is " + (int) 'A' + 2); | _____H_____ |
| (iv) | System.out.println("OUTPUT is " + (int)('A' + 5/4)); | _____E_____ |
| (v) | System.out.println("OUTPUT is " + (char)('A' + 5/4)); | _____B_____ |

- (A) OUTPUT is A
 (B) OUTPUT is B
 (C) OUTPUT is C
 (D) OUTPUT is 65
 (E) OUTPUT is 66
 (F) OUTPUT is 67
 (G) OUTPUT is 651
 (H) OUTPUT is 652
 (I) OUTPUT is A1
 (J) OUTPUT is A2

1(c). (10 pts) Write the println statement so it behaves correctly. You must use **ONLY** variables *charA* and *charB* in your solution. ('A' has the value 65 and 'B' has the value 66)

```
A + B is 131
```

```
char charA = 'A', charB = 'B';

System.out.println(charA + " + " + charB + " is " + (charA+charB) );
```

2. Expressions (40 pts)

Given the following variables, for each expression state whether it is legal or illegal. If the expression is **legal**, state what the result is. If the expression is **illegal**, state the type of the error (compile, logical or run-time). (Show your steps in evaluating the expression to get partial credit)

```
int      x = 5, y = -1, z = 0;
boolean b1 = true, b2 = false, b3 = false;
```

- | | | | |
|-------------------------------|--------------|----------------|--------------------|
| (a) $-y + x$ | legal | illegal | _____6_____ |
| (b) $x + y * z$ | legal | illegal | _____5_____ |
| (c) $!x$ | legal | illegal | _____compile_____ |
| (d) $z / y < x$ | legal | illegal | _____true_____ |
| (e) $x < y \parallel z > x$ | legal | illegal | _____false_____ |
| (f) $x + y / z$ | legal | illegal | _____run-time_____ |
| (g) $!b2$ | legal | illegal | _____true_____ |
| (h) $b3 \parallel b2 \&\& b1$ | legal | illegal | _____false_____ |
| (i) $(x != y) \&\& !b2$ | legal | illegal | _____true_____ |
| (j) $x + y > z \&\& b1$ | legal | illegal | _____true_____ |

3. Control Flow Statements (40 pts)

3(a) (24 pts) Complete the Java expressions that would appear in the `if` statements below to test for each of the following conditions using variables `x` and `y`.

- | | | | |
|---|-------------------|--|----------------|
| a. <code>x</code> is less than or equal to 15 | <code>if (</code> | <code>x <= 15</code> | <code>)</code> |
| b. <code>x</code> is not between <code>-5</code> and <code>5</code> | <code>if (</code> | <code>!(x > -5 && x < 5) or x <= -5 x >= 5</code> | <code>)</code> |
| c. <code>x</code> absolute value is not equal to 100 | <code>if (</code> | <code>x != 100 && x != -100</code> | <code>)</code> |
| d. both <code>x</code> and <code>y</code> are positive | <code>if (</code> | <code>x > 0 && y > 0</code> | <code>)</code> |
| e. <code>x</code> divided by <code>y</code> is greater than 1 | <code>if (</code> | <code>x / y > 1 or x > y</code> | <code>)</code> |
| f. <code>x</code> plus <code>y</code> is negative | <code>if (</code> | <code>x + y < 0</code> | <code>)</code> |

3(b). (16 pts) For each value of `score` below, give the output from the execution of the following program segment

```
Scanner input = new Scanner (System.in);

char grade;

int score = input.nextInt();

if (score >= 900) grade = 'A';
else if (score >= 800) grade = 'B';

if (score >= 700) grade = 'C';
else if (score >= 600) grade = 'D';
else grade = 'F';

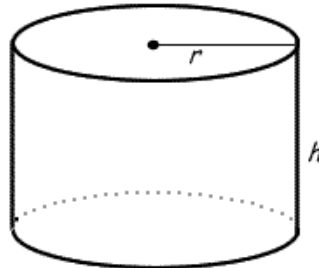
System.out.println("Your grade is " + grade);
```

- | | |
|------------------------------|----------------|
| a. <code>score = 850</code> | <code>C</code> |
| b. <code>score = 750</code> | <code>C</code> |
| c. <code>score = 650</code> | <code>D</code> |
| d. <code>score = -100</code> | <code>F</code> |

4. Coding (40 pts)

In lab 4, we gave an example of how to calculate the average of two numbers. For this question, you will be creating a similar program that calculates the area and volume of a cylinder. (pi or π is 3.14)

Therefore the
Formula is: $A = 2\pi r^2 + 2\pi rh$



Volume $V = \pi r^2 h$

Here are the steps the program should perform:

1. Create a variable called **radius** and a variable called **height**.
2. Ask the user to enter a double for the radius.
3. Ask the user to enter a double for the height.
4. Print the area of the cylinder.
5. Print the volume of the cylinder.

Here is a sample run of what the program should look like:

```
Enter Radius 2
Enter Height 3
Cylinder Area 62.8
Cylinder Volume 37.68
```

ANSWER HERE:

```
import java.util.Scanner;

public class Cylinder {

    public static void main(String[] args) {
        final double pi = 3.14;
        double radius, height, area, volume;

        Scanner kbd = new Scanner(System.in);

        System.out.print("Enter Radius ");
        radius = kbd.nextDouble();

        System.out.print("Enter Height ");
        height = kbd.nextDouble();

        area = 2*pi*radius*radius + 2*pi*radius*height;
        volume = pi*radius*radius*height;

        System.out.println("Cylinder Area " + area);
        System.out.println("Cylinder Volume " + volume);
    }
}
```

5. Numbers (40 pts)

Fill in the following chart with equivalent values for each base ($16^3 = 4096$, $16^2 = 256$). You may leave the answer as a formula $D*B^p$ if you so desire (first two rows are 2 pts each and the rest are 4 pts) :

Decimal (Base 10)	Binary (Base 2)	Hexadecimal (Base 16)
10	<i>1010</i>	<i>0xA</i>
2	10	<i>0x2</i>
16	<i>1 0000</i>	0x10
255	<i>1111 1111</i>	<i>0xFF</i>
<i>15*4096 + 10*256 + 5*16+1</i> <i>or</i> <i>64081</i>	1111 1010 0101 0001	<i>0xFA51</i>
<i>10*4096+11*256+12*16+13</i> <i>or</i> <i>43981</i>	<i>1010 1011 1100 1101</i>	0xABCD