

Unit 1 – ICS3U0 – Introduction to Java

Sample Test, Monday February 24, 2025

Name: Gorski

Total	Knowledge	Communication	Thinking	Application
(100)	(30)	(24)	(24)	(22)

Knowledge

1. Answer the following questions:

/6

	Instruction	Data	Answer																								
(a)	Translate from our number system to binary.	22	<table border="1"> <tr><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td></tr> </table>	16	8	4	2	1	1	0	1	1	0														
16	8	4	2	1																							
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(b)	Translate to binary.	H (which is 72)	<table border="1"> <tr><td>64</td><td>32</td><td>16</td><td>8</td><td>4</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> </table>	64	32	16	8	4	2	1	1	0	0	1	0	0	0										
64	32	16	8	4	2	1																					
1	0	0	1	0	0	0																					
(c)	Translate from Unicode to binary. A 10 B 11 C 12 D 13 E 14 F 15	 12E5 (Ethiopic)	<table border="1"> <tr><td>8</td><td>4</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>2</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>4</td><td>1</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> </table>	8	4	2	1	1	0	0	0	1	2	0	0	1	0	4	1	1	1	0	5	0	1	0	1
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2	0	0	1	0																							
4	1	1	1	0																							
5	0	1	0	1																							
(d)	Translate from binary to hexadecimal.	<table border="1"> <tr><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> </table>	0	1	1	1	1	0	0	1	B 9																
0	1	1	1																								
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(e)	Translate from hexadecimal to binary.	<table border="1"> <tr><td>B</td><td>A</td></tr> <tr><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td></tr> </table>	B	A	1	0	1	0	1	0	1	0	<table border="1"> <tr><td>8</td><td>4</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td><td>0</td></tr> </table>	8	4	2	1	1	0	1	0	6	0	1	1	0	
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(f)	What letter is this ASCII?	<table border="1"> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td></tr> </table>	1	0	0	1	0	1	0	J																	
1	0	0	1	0	1	0																					

2. If x is 3 and y is 5, evaluate the following. (circle the correct answer)

/8

- True False Error a) $y != 2$ True False Error e) $x < 3$ $x >= 3$
 True False Error b) $x = y$ *== needed* True False Error f) $(x == 3) \&\& (y == 3)$
 True False Error c) $2 <= y <= 10$ *2 <= y && y <= 10* True False Error g) $(x == 3) || (y == 3)$
 True False Error d) $x == 3 || 5$ *x == 3 || x == 5* True False Error h) $(x > 2) \&\& (x < 8)$

3. If x is 3 and y is 5, then what are the values of the following? Show all of the steps.

/4

- a) $x != 3 || y < 10$ *sub in first*
 $= 3 != 3 || 5 < 10$
 $= F || T$
 $= T$
- b) $!((x < y) \&\& (x == 3))$
 $= !((3 < 5) \&\& (3 == 3))$
 $= !(T \&\& T)$
 $= !T$
 $= F$

4. Write a Boolean expression to represent each of the following:

/3

a) x does not equal 3

$x \neq 3$

b) x is less than 3 or greater than 99

$x < 3 \ || \ x > 99$

c) x is between 3 and 99

$x > 3 \ \&\& \ x < 99$

5. The following questions are based on this class.

/9

```
public class q5test
{
    public static void main (String args[])
    {
        new q5test ();
    }

    public q5test ()
    {
        int x = IO.inputInt ("Number? ");
        if (x == 4)
            System.out.print ("Square");
        else if (x < 1)
            System.out.print ("Circle");
        else if (x > 10)
            System.out.print ("Triangle");
        else if (x == 9)
            System.out.print ("Rectangle");
        else
            System.out.print ("Hexagon");
    }
}
```

Identify the following in the code:

(a)	What is the class name?	q5test
(b)	What type of variable is declared?	int
(c)	What is the variable name?	x
(d)	What should the file be saved as?	q5test.java

What is printed for each of the following inputs?

x is 11	Triangle
x is 5	Hexagon
x is 4	Square
x is 0	Circle
x is 9	Rectangle

Communication

6. Fill in the blanks in the Madlibs story's constructor after looking at the output below.

/8

Input/Output

num1 Enter a number: 36
 ani Enter an animal: cat
 noun Enter a noun: noodle
 noun2 Enter another noun: Tree

Tips for Geometry

Tree classifications are useful in geometry. For a 36-sided shape remember that is called a noodleagon. To identify the noodleagon, remember that it looks like a cat.

```
public mathMadLibs () {
    int num1 = IO.inputInt ("Enter a number : ");
    String ani = IO.inputString ("String ("Enter an animal: ");
    String noun = IO.inputString ("Enter a noun: ");
    String noun2 = IO.inputString ("Enter another noun: ");

    System.out.println ("\nTips for Geometry \n");
    System.out.println ("noun2 + " classifications are useful in geometry.");
    System.out.println ("For a " + num1 + "-sided shape remember that is called");
    System.out.println ("a " + noun + "agon. To identify the " + noun + "agon,");
    System.out.println ("remember that it looks like a " + ani + ".");
}
```

use variables *

7. Provide the term for each definition.

/8

ASCII	a) chars are stored in this 7-bit letter encoding format.
Math.PI	b) Java's math function for 3.14159.
Declare	c) The term for making a new variable.
Unicode	d) A way of encoding all the world's languages into binary.
Type	e) The amount of RAM (memory) allocated to a variable.
Else	f) The last (optional) clause of an if.
Main Method	g) The starting point of the program.
int	h) Mod can only be used with this variable type.

8. Why are each of the following variable names inappropriate?

/4

parallel lines space
 2sided Starts with number
 class keyword
 key* special character

9. Why is everything on a computer stored in binary? (2 points, one sentence for each)

/2

Binary only uses two digits: 0 and 1. This means that the hardware used to store it only needs 2 settings, say 0=off, 1=on or 0=not reflected, 1=reflected. Storing things on hardware with only 2 options is easier than Base 10 (decimal).

10. Why are flowcharts useful? (2 points, one sentence for each)

/2

Flowcharts, with their shapes and arrows, show the path through the program. This helps visualize code.
 Flowcharts used to be drawn as part of the planning process to layout input, output and boolean expressions needed.

Thinking

11. Assume all numbers are integers. What are the answers to the following questions?

/4

24/2= 12	8/45= 0	25/6= 4	50/0= undefined
24%2= 0	8%45= 8	25%6= 1	50%0= undefined

12. Classify each piece of input with the most appropriate type.

14

(a) n

char
int

(c) circle

String
int

(e) (905) 453-9220

String
double

(b) 2

(d) -4

(f) 1.41421

13. Match the flowchart symbol with its description AND the statement that might appear in it.

16

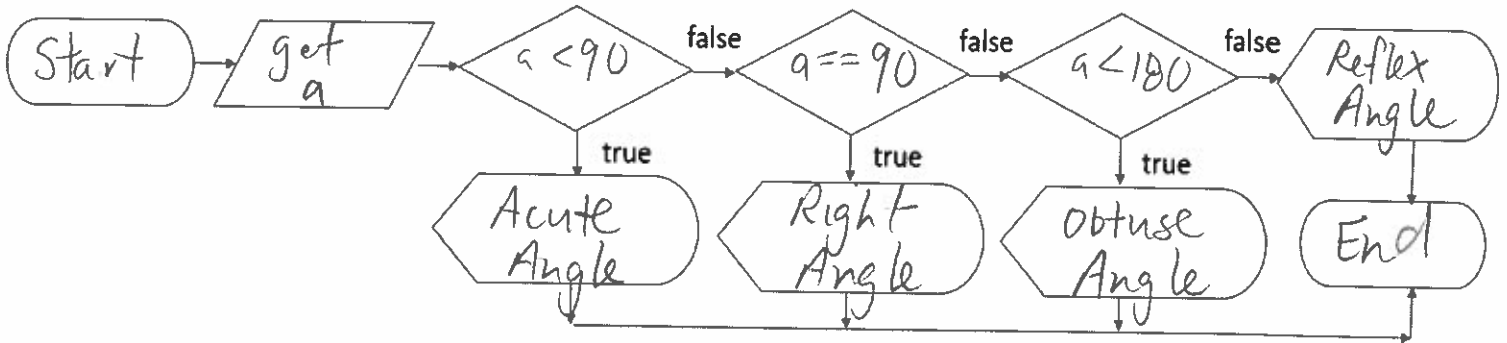
<u>A</u> Decision	<u>A</u> $x \% 2 == 0$ 2 equals is a Boolean Expression	<u>B</u> double tax = IO.inputDouble ("Tax? ");	<u>C</u> System.out.println("Circles are great. ");	<u>B</u> Input
<u>E</u> Process	<u>C</u> Start			
<u>C</u> Output				

14. Use the code to fill in the blanks on the flow chart below.

15

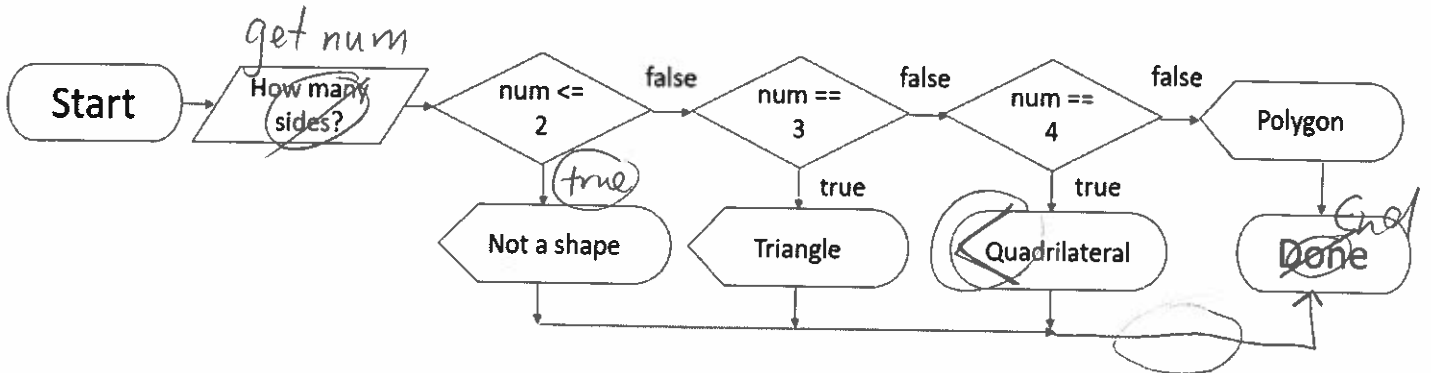
The Code:

```
int a = IO.inputInt ("Enter an angle size in degrees: ");
if (a < 90)
    System.out.println ("Acute Angle");
else if (a == 90)
    System.out.println ("Right Angle");
else if (a < 180)
    System.out.println ("Obtuse Angle");
else
    System.out.println ("Reflex Angle");
```



15. Circle and correct 5 errors in this flowchart.

15

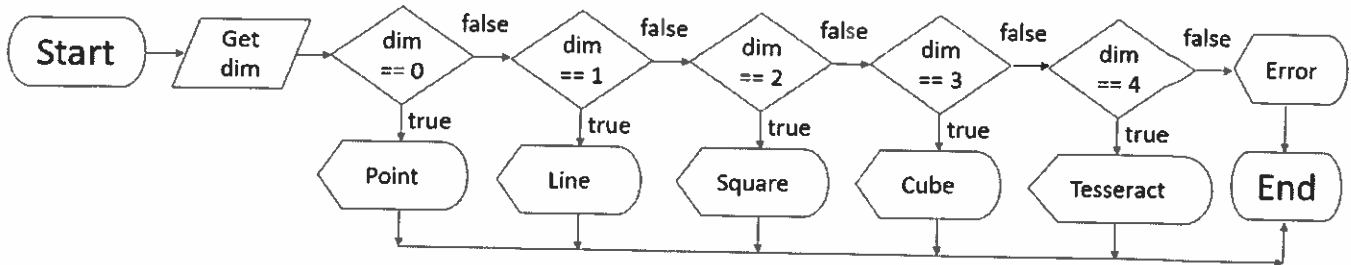


Application

Sample runs of the program are shown. The user input is underlined. Format output **exactly** as shown.

16. Write code that would result from this flowchart. (dim is an integer)

/5



```

int dim = IO.inputInt("Enter a dimension: ");
if( dim == 0 )
    System.out.println("Point");
else if( dim == 1 )
    System.out.println("Line");
else if( dim == 2 )
    System.out.println("Square");
else if( dim == 3 )
    System.out.println("Cube");
else if( dim == 4 )
    System.out.println("Tesseract");
else
    System.out.println("Error");
  
```

17. A box holds 18 books. A crate holds 15 boxes (or 270 books). Ask the user how many books they have and print out the number of crates and boxes they will need.

How many books? 394

That needs 1 crate(s), 6 box(es) with 16 book(s) left over.

/5

```

int books = IO.inputInt("How many books?");
int crate = books / 270;
books = books % 270;
int box = books / 18;
books = books % 18;
System.out.print("That needs " + crate + " crate(s), ");
System.out.print(box + " box(es) with ");
System.out.println(books + " book(s) left over");
  
```

18. Dorothy Vaughn is running in a by-election against Mary Jackson.
 Make a program that asks how many votes each candidate received. The user input is underlined.
 Calculate the percentage of votes for Vaughn and for Jackson.
 Also, print out who won the election: **Don't forget that they might tie.**

/12

Hint: Remember \t and \n.

Format output **exactly** as shown.



Enter the number of votes for Vaughn: 1276
 Enter the number of votes for Jackson: 952

W Total Votes: 2228
 Vaughn: It 57.27 %
 Jackson: 42.73 %

* Already in-
 Vaughn won.

```
int v = IO.input Int ("Enter the number of votes for Vaughn:");
int j = IO.input Int ("Enter the number of votes for Jackson:");
```

```
int total = v + j;
double v_percent = v * 100 / total;
double j_percent = j * 100 / total;
```

```
System.out.println("\n Total Votes: It " + total);
System.out.println(" Vaughn: It " + v_percent + " %");
System.out.println(" Jackson: It " + j_percent + " %");
* System.out.println();
```

```
if (v > j)
    System.out.println(" Vaughn won.");
else if (j > v)
    System.out.println(" Jackson won.");
else
    System.out.println(" Tie.");
```