

Name: _____

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

    public myProgram ()
    {
        System.out.println ("Howdy!");
    }
}
```

1. Circle all of the words whose first letter is capitalized.
2. Underline all of the times that "myProgram" appears in the code.
3. What types of brackets are there in this program?
_____, _____, _____
4. Type in this program **exactly** as it appears. Run it. When you have no errors, what appears on the screen?

This program has some "areas" as shown below:

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

    public myProgram ()
    {
        system.out.println ("Howdy!");
    }
}
```

A program is in a class. This class is called "myProgram"

The main method starts the program. It tells Java to run a "myProgram".

The constructor is where you put the code. The constructor's name is "myProgram". It must be the same as the class name.

5. What is the class name of this program? _____
6. What is the name of the constructor? _____
7. Are there any spaces in these names? yes or no (circle)



These questions refer to the program on the right.

8. What is the class name?
9. What is the constructor name?
10. How many lines of code are in the constructor?
11. How many semi-colons are in the program?
12. What does the program make on the screen?
13. What you think System.out.println does?

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

    public what ()
    {
        System.out.println (" (< ");
        System.out.println (" / ) ");
        System.out.println (" ^ ");
    }
}
```

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

    public strangeLetters ()
    {
        System.out.println ("A B");
        System.out.print ("C");
        System.out.println (" D");
        System.out.println ("E \t F \t G");
        System.out.println ("H \n I");
        System.out.println ("J \\ K \\ " L");
    }
}
```

14. Type in the program and run it. In the space below, write out exactly what it prints on the screen:

A '\ ' before a character signals that the character that follows is going to be something strange.

15. What does System.out.print do? (Not println, but print). _____

16. What does \t make on the screen? _____

17. What does \n make on the screen? _____

18. What does \" make on the screen? _____

19. What does \\ make on the screen? _____

20. There are 5 errors in this program. Circle and correct them.

```
public class Birthday
{
    public void static main (String args)
    {
        new BirthdayCard ()
    }

    public BirthdayCard ()
    {
        System.put.println ("HAPPY BIRTHDAY!");
        System.out.println ("");
        System.out.println ("    ||||    ");
        System.out.println ("    @.@.@.@ ");
        System.out.println ("    |.=.=.=.| ");
        System.out.println ("    @.@.@.@.@ ");
        System.out.println ("    |.=.=.=.=.| ");
        System.out.println ("    @.@.@.@.@.@");
    }
}
```

21. Fill in the blanks so that the output is printed.

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

    public ram ()
    {
        System.out.println ("_____");
        System.out.println ("_____");
        System.out.println ("_____");
    }
}
```

Output:
RAM is memory.
It is in the computer.
The program is in RAM.

22. There are 5 errors in this program. Circle and correct them.

```
public glass fix
{
    public static void main (String [])
    {
        new fixME ();

        public fix ()
        {
            System.out.println ("This program is broken.")
        }
    }
}
```



Variables Types & Input

1.5  T

Name: _____

1. Classify each piece of input with the most appropriate type (int, double, String, char)

(a) cat	<input type="text"/>	(d) 235.3	<input type="text"/>	(g) I am Sam, Sam I am	<input type="text"/>
(b) 0.2344	<input type="text"/>	(e) 5	<input type="text"/>	(h) L4V 5E6	<input type="text"/>
(c) -89	<input type="text"/>	(f) K	<input type="text"/>	(i) (905)-453-9200	<input type="text"/>

2. Fill in the table with information about each variable.

	Name	Type	Starting Value
<code>String fruit = "banana";</code>			
<code>int num=2;</code>			
<code>boolean ans=true;</code>			
<code>char yORn= 'y';</code>			
<code>double num2 =5.345;</code>			

3. Fill in the table with information about each variable.

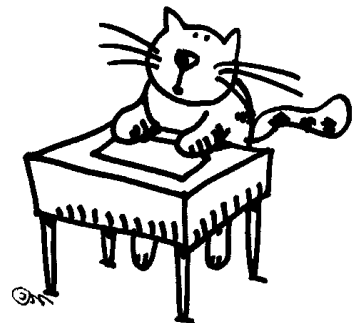
	Name	Type	Starting Value
It will hold the number of apples the user wants to buy.			
It will hold the user's name.			
It will hold the user's postal code (eg. L6V 3F7)			

4. Fill in the types: double, String, int.

_____ title = IO.input_____ ("What is the book title? ");
 _____ change = IO.input_____ ("How much change do you get?");
 _____ chairs = IO.input_____ ("How many chairs are here? ");
 _____ mark = IO.input_____ ("What mark did you get? ");
 _____ year = IO.input_____ ("What year is it? ");
 _____ verb = IO.input_____ ("Enter a verb: ");

5. True / False: Circle the correct response.

- T F a) Variable names can have spaces in them.
- T F b) Variable names should be meaningful so you can remember them.
- T F c) Math functions can only be done with double type variables.
- T F d) Variables are stored on the hard drive.
- T F e) A type is the amount of memory your variable needs.
- T F f) Variables hold the results from calculations until you need them again.
- T F g) Every variable must have a type.
- T F h) The names 'count', 'COUNT', 'cOuNt' would all refer to the same variable.
- T F i) Keywords (like public or main) make fantastic variable names.



6. Which are valid variable names? Mark if it is a bad name and if it is a good one.

(Variable names (1) have no spaces, (2) do not start with a number, (3) do not contain special characters)

frog	greenFrog	Eat bugs	great!
@name	cats2	2017	1stplace
Long word	5teams	Brampton	BCSS

7. (a) When you enter these words (left), what is written on the screen (right)?

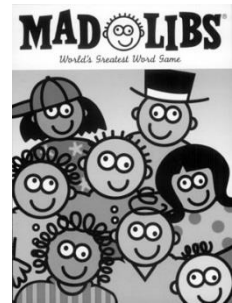
Enter a made-up name: Ooklum Enter a colour: green Enter a number: 3 Enter another number: 45	A Strange Animal..... The _____ is an animal that has _____ fur with spots on its tail. An adult _____ may weigh over _____ pounds and stand over _____ feet tall.
------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

(b) Fill the variable names into the output to make the story.

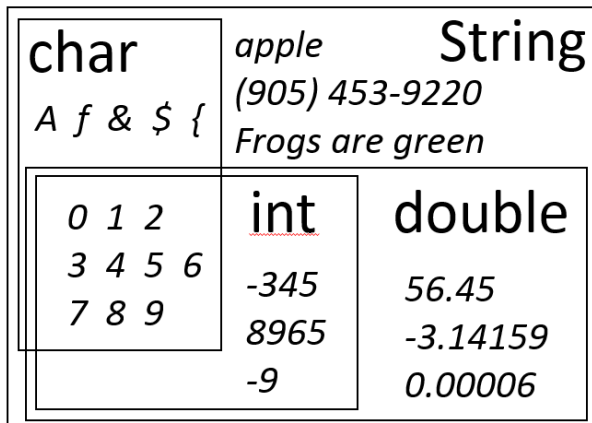
```
public class Animal
{
    public static void main (String args [])
    {
        new Animal ();
    }

    public Animal ()
    {
        String madeup = IO.inputString ("Enter a made-up name: ");
        String col = IO.inputString ("Enter a colour: ");
        int num = IO.inputInt ("Enter a number: ");
        int num2 = IO.inputInt ("Enter another number: ");

        System.out.println ("");
        System.out.println ("A Strange Animal.....");
        System.out.println ("The "+ _____ +" is an animal that has "+ _____ +" fur with");
        System.out.println ("spots on its tail. An adult "+ _____ +" may weigh over "+ _____ );
        System.out.println ("pounds and stand over "+ _____ +" feet tall.");
    }
}
```



8. Look at this Venn diagram (circles didn't work well so Ms. Gorski used rectangles).



(a) Which type can hold all others?

(b) Which type can hold all numbers?

Find data in the diagram that is...

(c) ... a double but not an int.

(d) ... an int but not a char.

(e) ... a String but not an int.

(f) ... a double but not a String.

(g) ... an int but not a double.

9. Which type must have the most bits allocated to it? Explain why.

.....

.....

10. It is possible to use Strings to store all input. Provide two reasons why that is a bad idea.

.....

.....

Math Functions

Name: _____

1. Match the java code with the math function. (Addition, Multiplication, Power, Square Root, π , Division, Subtraction)

$x + y$	$x - y$	$x * y$	x / y
Math.PI	Math.sqrt(x)	Math.pow(x, 3)	

2. This code calculates the area of a circle.

```
double radius = IO.inputDouble("Enter the radius: ");
double area = Math.PI * Math.pow(radius, 2);
System.out.println("The area of the circle is " + area);
```

- a) What are the names of the two variables? _____ and _____.
- b) Which variable is used to hold the user's input? _____
- c) Rewrite this line #2 as you would in math class. _____
- d) If the user types 1, what is outputted? (words too) _____

3. Fill in the blanks.

The equation to find the mass of the ice cube is: $w = 0.8e^3$

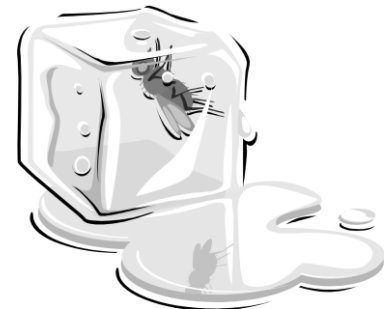
```
public class icy
{
    public static _____ main (String args[])
    {
        new _____ ();
    }

    _____ icy ()
    {
        _____ .out.println ("Let's find the weight of an ice cube...");

        double e = IO.input_____ ("What is the length of one of the sides? (in cm) ");

        double w = _____ * Math.pow(____, 3);

        System.out._____ ("The ice cube weights "+w+" grams.");
    }
}
```



4. How would you write: $h = rt - 4.9t^2$ in java? (Circle the right answer)

- (a) `double h = r*t - (4.9*Math.pow(t,2));` (b) `double h = rt - 4.9Math.pow(t,2);`
- (c) `double h = (r*t - 4.9)*Math.pow(t,2);` (d) `double h = r*t - 4.9 * t*2;`

5. How would you write: $V = \frac{1}{3} Bh$ in java? (Circle the right answer)

- (a) `double V = $\frac{1}{3}$ *B*h;` (b) `double V = 1/3*B*h;`
- (c) `double V = B*h/1/3;` (d) `double V = 1/3*(Bh);`

6. Which of the following is the equation double $V = C * (1 - (n / N))$; as written in math class?

(Circle the right answer)

(a) $C = V \left(1 - \frac{N}{n}\right)$ (b) $V = C \left(1 - \frac{N}{n}\right)$ (c) $V = C \left(1 - \frac{n}{N}\right)$ (d) $V = \left(C - \frac{1}{N}\right)$

7. Convert these equations into java:

a) $V = \frac{4}{3} \pi r^3$	<code>double V = 4/3*Math.pi*Math.pow(r, 3);</code>
b) $F = \frac{9}{5} C + 32$	
c) $P = 2l + 2w$	
d) $m = \frac{y - b}{x}$	
e) $S = \frac{1}{2} at^2$	
f) $R = \frac{rst}{rs + st + rt}$	

8. **Correct** the five errors that are bolded in this code. It asks the user how many hamburgers, drinks and fries they want, then calculates the subtotal, tax and total.

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

    public hamburger ()
    {
        int hamburg = IO.inputDouble ("How many hamburgers? ");
        int drink = IO.inputInt ("How many drinks? ");
        int fries = IO.inputInt ("How many fries? ");

        double subtotal = ham * 1 + drink * 0.5 + fries * 0.25?
        int tax = subtotal * 0.14;
        double total = subtotal + tax;

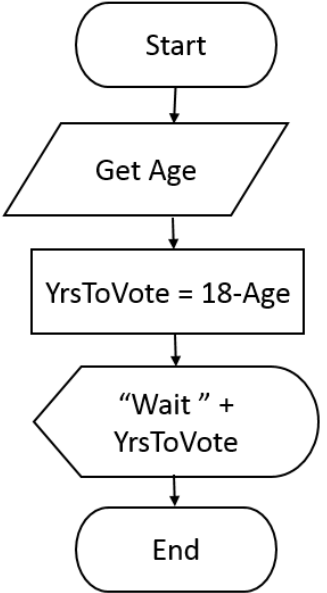
        System.out.println ("subtotal: $" + subtotal);
        System.out.println ("tax: $" + tax);
        System.out.println ("total: " + $total);
    }
}
```



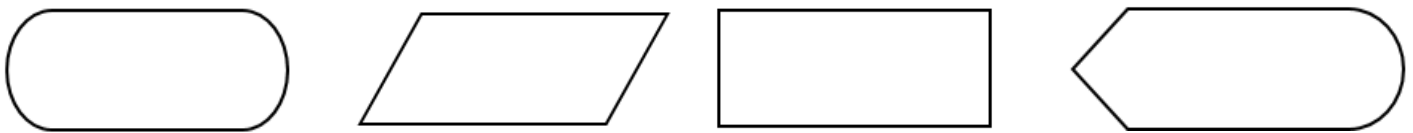
Simple Flow Charts

Name: _____

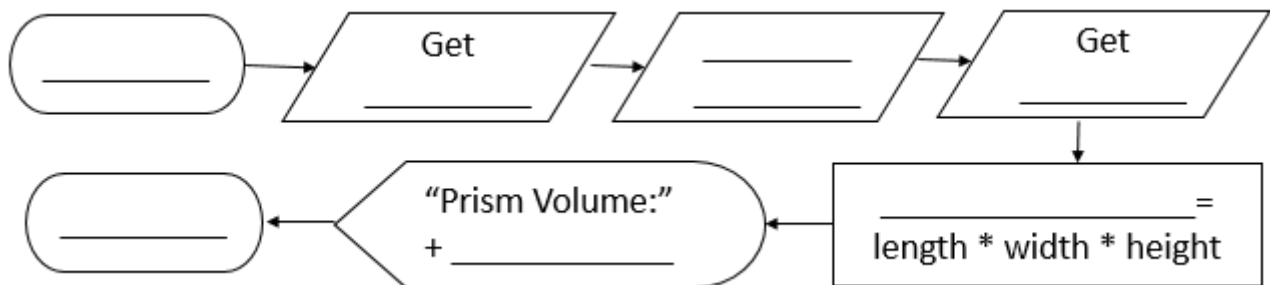
Flowcharts are used in planning programs. The designer figures out what is required and the programmer can easily translate it into code. Notice the flow chart symbols and their corresponding code in the example below:

<p>The program asks the user how old they are, then it calculates the number of years they have until they can vote.</p> <p>(This program doesn't work correctly for people over 18)</p>	 <pre> graph TD Start([Start]) --> GetAge[/Get Age/] GetAge --> Calc[$YrsToVote = 18 - Age$] Calc --> Wait{{"Wait " + YrsToVote}} Wait --> End([End]) </pre>	<pre> public VotingAge() { int Age = IO.inputInt ("Enter your age: "); int YrsToVote = 18 - Age; System.out.println("Wait " + YrsToVote); } </pre>
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1. Write the function (Display, Terminal, Process, Input) inside the flowchart symbol used to show it.



2. Using the code, fill in the flowchart.



Code:

```

public prism ()
{
    int length = IO.inputInt ("Enter the length: ");
    int width = IO.inputInt ("Enter the width: ");
    int height = IO.inputInt ("Enter the height: ");

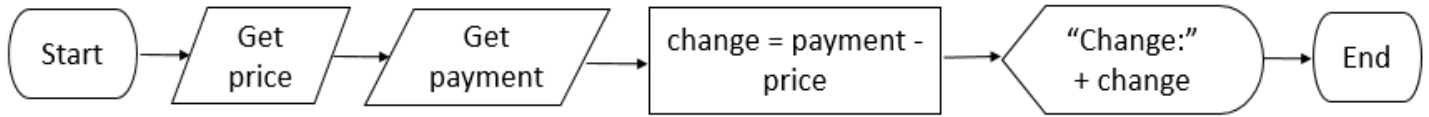
    int volume = length * width * height;

    System.out.println ("Prism Volume: " + volume);
}
        
```

3. Choose true or false for each of the following rules about flowcharts.

- T F a) A flowchart can only have one start.
- T F b) All flowchart lines must have arrows.
- T F c) A process can have multiple arrows coming out of it.
- T F d) A flowchart can have multiple ends.
- T F e) Input can only have one arrow coming out of it.
- T F f) All flowchart symbols must be connected with arrows.

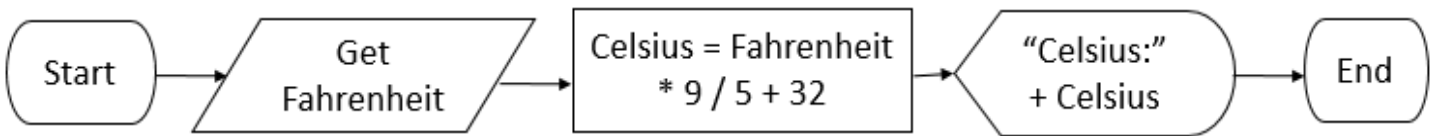
4. Using the flowchart, fill in the code on the bottom.



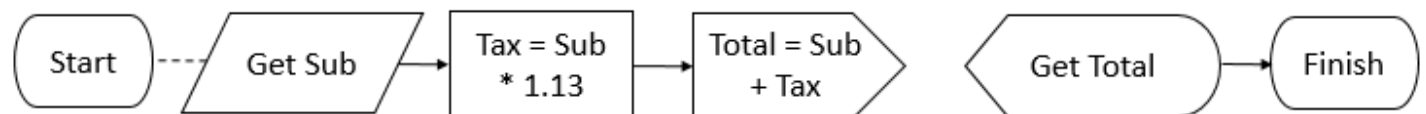
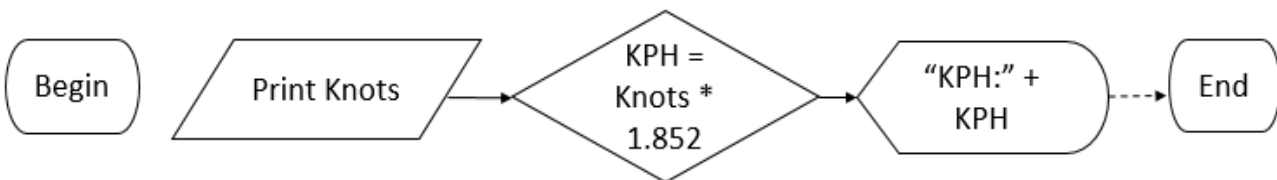
```

public changeCalculator ()
{
    double _____ = IO.input_____ ("Enter the price: ");
    double _____ = IO.input_____ ("Enter the payment: ");
    _____ change = _____ - _____;
    _____ ("Your change is: " + _____);
}
  
```

5. Using the flowchart, write the program.



6. In EACH FLOWCHART, correct 5 errors.



Integer Division and Mod

Name: _____

In computing, the modulo (mod) operation finds the remainder of division of one number by another. For instance, the expression "5 % 4" would evaluate to 1 because 5 divided by 4 leaves a remainder of 1. However, "9 % 3" would evaluate to 0 because the division of 9 by 3 leaves a remainder of 0; there is nothing to subtract from 9 after multiplying 3 times 3. In Java, mod can only be used on *integers*.

1. Fill in the answers to the following division questions.

- a) $20 \div 6 =$ **3** with a remainder of **2**.
- b) $25 \div 4 =$ _____ with a remainder of _____.
- c) $18 \div 5 =$ _____ with a remainder of _____.
- d) $60 \div 1 =$ _____ with a remainder of _____.
- e) $50 \div 5 =$ _____ with a remainder of _____.
- f) $6 \div 6 =$ _____ with a remainder of _____.

$(6 \times 3 = 18 + 2 = 20)$



2. Run this code, write in the answers in the space provided.

<pre>public class mod { public static void main (String args[]) { new mod (); } public mod () { System.out.println ("25/1=" + (25 / 1)); System.out.println ("25%1=" + (25 % 1) + "\n"); System.out.println ("25/2=" + (25 / 2)); System.out.println ("25%2=" + (25 % 2) + "\n"); System.out.println ("25/3=" + (25 / 3)); System.out.println ("25%3=" + (25 % 3) + "\n"); System.out.println ("25/4=" + (25 / 4)); System.out.println ("25%4=" + (25 % 4) + "\n"); System.out.println ("25/5=" + (25 / 5)); System.out.println ("25%5=" + (25 % 5) + "\n"); System.out.println ("25/6=" + (25 / 6)); System.out.println ("25%6=" + (25 % 6) + "\n"); System.out.println ("25/7=" + (25 / 7)); System.out.println ("25%7=" + (25 % 7) + "\n"); } }</pre>	<p>Answers:</p> <p>25/1=_____, 25%1=_____</p> <p>25/2=_____, 25%2=_____</p> <p>25/3=_____, 25%3=_____</p> <p>25/4=_____, 25%4=_____</p> <p>25/6=_____, 25%6=_____</p> <p>25/7=_____, 25%7=_____</p>
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In the above code:

- (a) What's the name of the class? _____, of the constructor? _____
- (b) What should the file be saved as? _____
- (c) Is there input in this code? (y / n), Is there output in this code? (y / n)

3. Fill in the following:

$8 / 2 =$	$4 / 3 =$	$9 / 4 =$	$10 / 5 =$
$8 \% 2 =$	$4 \% 3 =$	$9 \% 4 =$	$10 \% 5 =$
$12 / 5 =$	$21 / 6 =$	$81 / 5 =$	$15 / 4 =$
$12 \% 5 =$	$21 \% 6 =$	$81 \% 5 =$	$15 \% 4 =$

4. Using mod to find even and odd numbers:

Even numbers % 2

$10 \% 2 =$	$4 \% 2 =$	$8 \% 2 =$	$60 \% 2 =$
-------------	------------	------------	-------------

Odd numbers % 2

$5 \% 2 =$	$21 \% 2 =$	$33 \% 2 =$	$9 \% 2 =$
------------	-------------	-------------	------------

What's the pattern?

5. Some other things to note:

Mod 1

$10 \% 1 =$	$4 \% 1 =$	$21 \% 1 =$	$7 \% 1 =$
-------------	------------	-------------	------------

Mod itself

$5 \% 5 =$	$24 \% 24 =$	$1 \% 1 =$	$9 \% 9 =$
------------	--------------	------------	------------

What's the pattern?

6. Run this code. Note what happens and why it happens.

<pre>public class mod { public static void main (String args[]) { new mod (); } public mod () { System.out.println ("25/0=" + (25 / 0)); System.out.println ("25%0=" + (25 % 0)); } }</pre>	<p><i>Answers:</i></p> <p>$25/0=$_____</p> <p>$25\%0=$_____</p>
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Why does this happen? (Think back to grade 9 math).

Name: _____

1. Evaluate the following.

a) What is the symbol for and? _____	f) What is T && T? _____	j) What is T T? _____
b) What is the symbol for or? _____	g) What is T && F? _____	k) What is T F? _____
c) What is the symbol for not? _____	h) What is F && T? _____	l) What is F T? _____
d) What is !T? _____	i) What is F && F? _____	m) What is F F? _____
e) What is !F? _____		

2. If x is 6, what value are each of the following?

- T F a) $x > 6$
- T F b) $x \geq 6$
- T F c) $x < 6$
- T F d) $x == 6$
- T F e) $x != 6$
- T F f) $x != 8$
- T F g) $x > 8$
- T F h) $x == 8$
- T F i) $!(x != 6)$



3. Evaluate these Boolean expression if x is 5.

(a) $!(x > 12)$

= $!(__ > 12)$ <sub in 5 for x
 = $!(__)$ <evaluate as true or false
 = $______$ <evaluate the ! not

(b) $(x > 2) \ \&\& \ (x < 7)$

= $(__ > 2) \ \&\& \ (__ < 7)$ <sub in 5 for x
 = $(__) \ \&\& \ (__)$ <evaluate as true or false
 = $______$ <evaluate the && and

(c) $(x < 8) \ || \ ((x < 3) \ \&\& \ (x != 9))$

= $(__ < 8) \ || \ ((__ < 3) \ \&\& \ (__ != 9))$ <sub in 5 for x
 = $(__) \ || \ ((__) \ \&\& \ (__))$ <evaluate as true or false
 = $(__) \ || \ (______)$ <evaluate the and
 = $______$ <evaluate the or

(d) $!(x < 3) \ \&\& \ (x > 4) \ || \ !(x < 6)$

= $!(__ < 3) \ \&\& \ (__ > 4) \ || \ !(__ < 6)$ <sub in 5 for x
 = $!(__) \ \&\& \ (__) \ || \ !(__)$ <evaluate as true or false
 = $(______ \ \&\& \ ______) \ || \ (______)$ <evaluate the ! nots
 = $______ \ || \ (______)$ <evaluate the first && and
 = $______$ <evaluate the || or

Ifs and Decision Statements

Name: _____

<p>1. Look at the code on the left.</p> <p>(a) Circle the semicolons. How many are there? _____</p> <p>(b) Underline the words if, else if and else.</p> <p>(c) Put a box around the Boolean expression.</p> <p>(d) What should the program be saved as? _____</p> <p>(e) How many variables are in the program? _____</p> <p>(f) What type of variables are in the program? _____</p>	<pre>public class largest { public static void main (String args []) { new largest (); } public largest () { int one = IO.inputInt ("The first number> "); int two = IO.inputInt ("The second number> "); int three = IO.inputInt ("The third number> "); if (one > two && one > three) System.out.println (one + " is the largest"); else if (two > three) System.out.println (two + " is the largest"); else System.out.println (three + " is the largest"); } }</pre>
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2. What is printed on the screen for each of the following values of n?

```
public class q1
{
    public static void main (String args[])
    {
        new q1 ();
    }

    public q1 ()
    {
        int n = IO.inputInt ("Value? ");
        if (n == 2)
            System.out.println ("Frog");
        else if (n > 4)
            System.out.println ("Cat");
        else if (n < 1)
            System.out.println ("Fox");
        else
            System.out.println ("Fish");
    }
}
```

Value of n?	Output
2	
4	
5	
1	
0	
3	

3. What is printed on the screen for each of the following values of g?

```
public class q2
{
    public static void main (String args[])
    {
        new q2 ();
    }

    public q2 ()
    {
        double g = IO.inputDouble ("Value? ");
        if (g > 9)
            System.out.println ("Red");
        else
            System.out.println ("Yellow");
        if (g != 3)
            System.out.println ("Green");
        else
            System.out.println ("Blue");
    }
}
```

Value of g?	Output
9	
10	
3	
4	
21	
0	

4. What is printed on the screen for each of the following values of month?

```
public class q3
{
    public static void main (String args[])
    {
        new q3 ();
    }

    public q3 ()
    {
        String month = IO.inputString ("Month? ");
        if (month.equals ("October"))
            System.out.println ("Halloween");
        else if (month.equals ("April"))
            System.out.println ("Showers");
        else if (!month.equals ("January"))
            System.out.println ("Enjoy");
        else
            System.out.println ("Resolution");
    }
}
```

Value of month?	Output
October	
April	
January	
March	
april	
halloween	

5. The following questions are based on this class:

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

    public chair ()
    {
        double bob = IO.inputDouble ("Number? ");
        if (bob > 10)
            System.out.println ("Red");
        else if (bob < 2)
            System.out.println ("Blue");
        else if (bob > 5)
            System.out.println ("Yellow");
        else if (bob != 3)
            System.out.println ("Green");
        else
            System.out.println ("Magenta");
    }
}
```

- (a) What is the name of this class? _____
- (b) What type of variable is declared? _____
- (c) What should the class be saved as? _____
- (d) What is printed for each of the pieces of input?

bob is 4 _____

bob is 3 _____

bob is 6 _____

bob is 12 _____

bob is 1 _____

6. Correct 6 errors in this code:

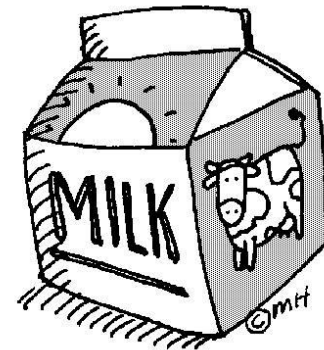
```
char c = IO.inputDouble ("Which letter? ");

if [ c == 'm')
    System.out.println ("MMMM");

else(c == 'i')
    System.out.println ("IIII");

else if (c = 'l');
    System.out.println ("LLLL");

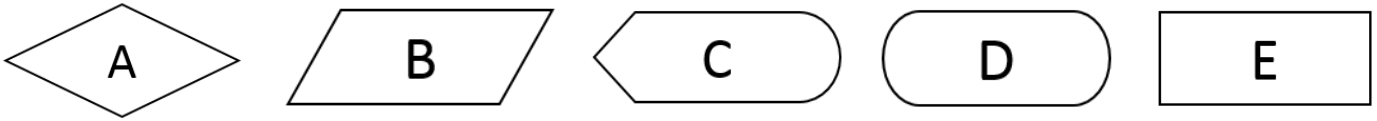
else
    System.out.println ("KKKK") 8
```



Ifs and Flow Charts

Name: _____

1. Match the flowchart symbol with the statement that might appear in it.

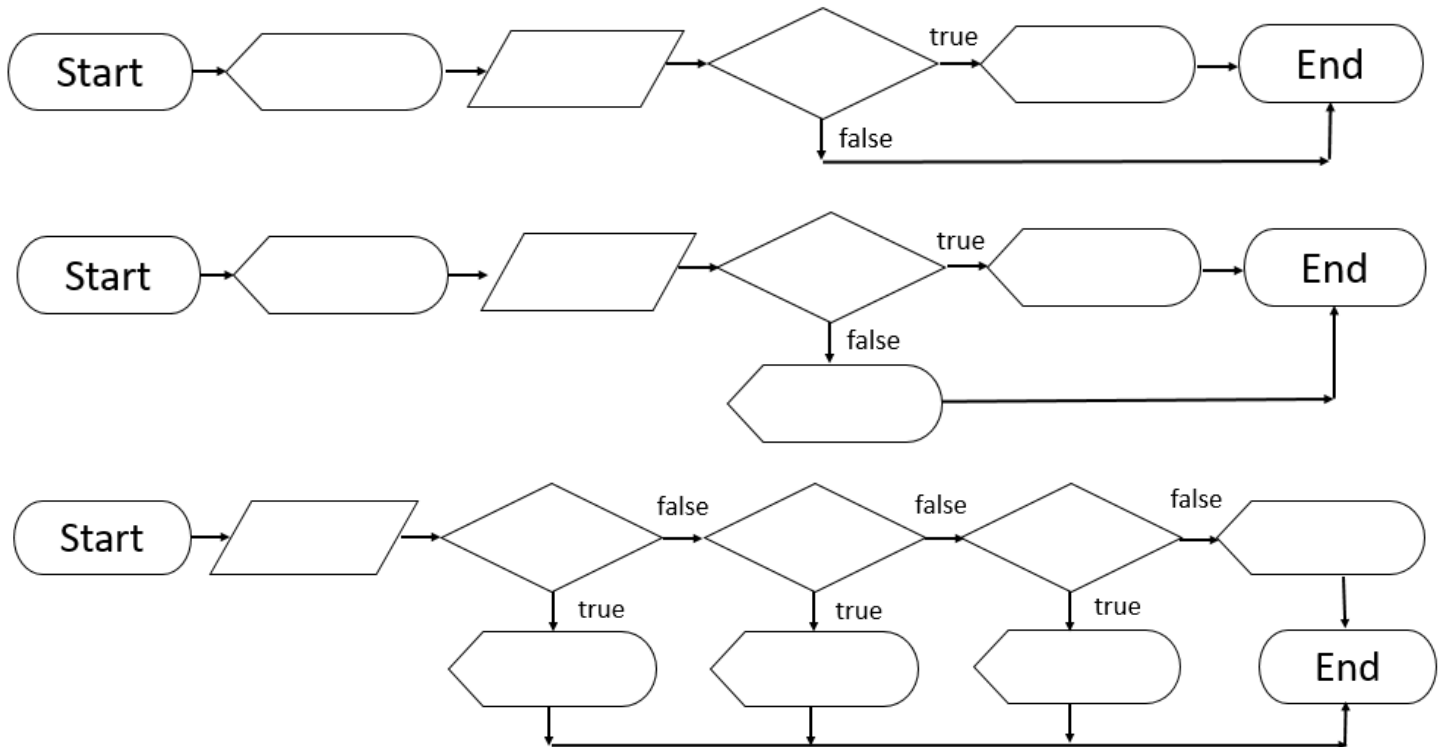


- _____ num > 5
- _____ End
- _____ num = 45 / num2;
- _____ int num = IO.inputInt("Number?");
- _____ Start
- _____ System.out.println("Hi");

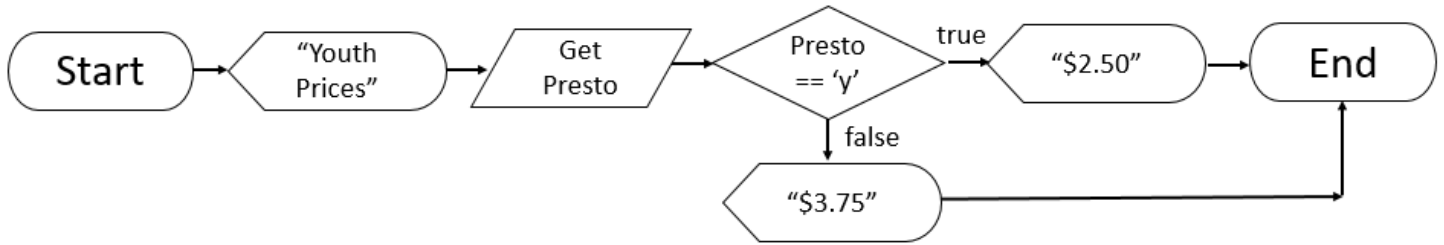
2. Each of these three segments of code (from Brampton Transit) matches one of the flowcharts below. Fill in the appropriate chart with the corresponding information.

```

System.out.println ("Fare Calculator");
char veteran = IO.inputChar ("Veteran? (y/n) ");
if (veteran == 'y')
    System.out.println ("Ride for free");
System.out.println ("Cash Fare to Go");
char train = IO.inputChar ("Riding Go Train? (y/n) ");
if (train == 'y')
    System.out.println ("$.80");
else
    System.out.println ("$.3.75");
int age = IO.inputInt ("Age? ");
if (age <= 5)
    System.out.println ("Preschool $0");
else if (age <= 19)
    System.out.println ("Child/Youth $2.50");
else if (age <= 64)
    System.out.println ("Adult $2.95");
else
    System.out.println ("Senior $1.60");
    
```



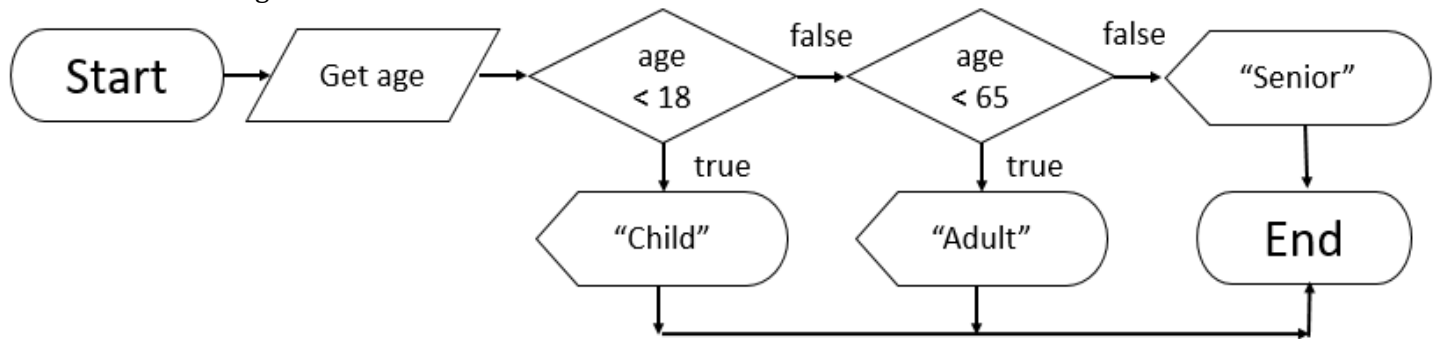
3. Look at the flowchart below and fill in the code below.



```

public BramptonTransit ()
{
    System.out.println ( _____ );
    _____ = IO.inputChar ("Using Presto (y/n) > ");
    if ( _____ )
        System.out.println ( _____ );
    else
        System.out.println ( _____ );
}
  
```

4. Write the code to go with this flowchart.



5. Correct four errors in this flowchart.

