Unit 3 – IDC2O – Graphics, Fractals, AI, Methods

Sample Test – Thursday November 5, 2026

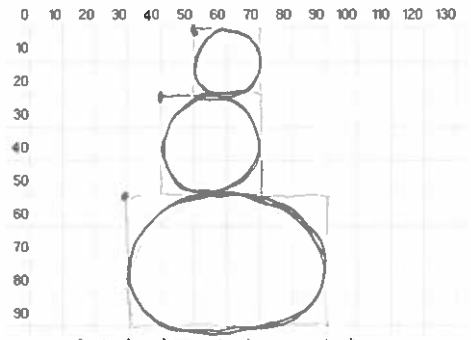
Name: Solutions

Total	%	Knowledge	Communication	Application	Thinking
(96)	%	(28)	(24)	(24)	(20)

Knowledge

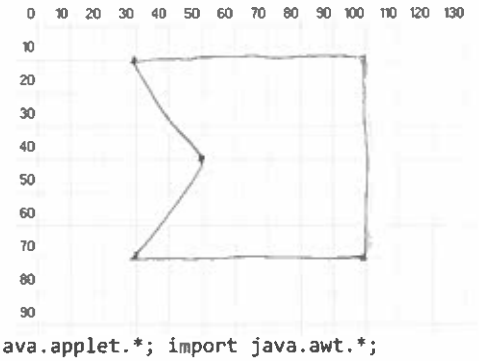
1. Draw what is drawn by this code. /12

A



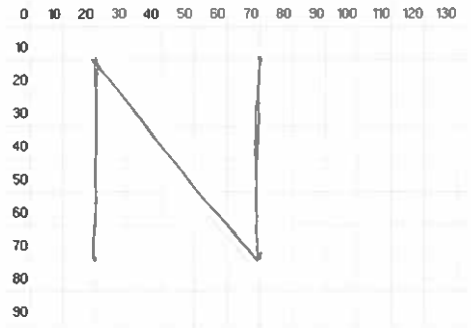
```
import java.applet.*; import java.awt.*;
public class partA extends Applet {
    public void paint (Graphics g) {
        g.drawOval (50, 0, 20,20);
        g.drawOval (40,20, 30,30);
        g.drawOval (30,50, 60,40);
    }
}
```

B



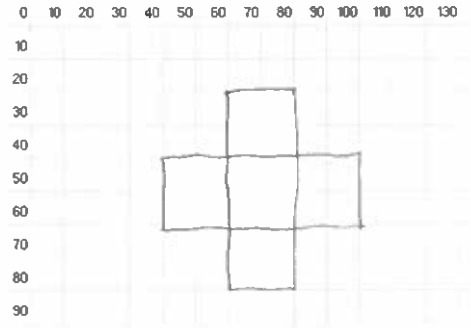
```
import java.applet.*; import java.awt.*;
public class partB extends Applet {
    public void paint (Graphics g) {
      g.setColor (Color.blue);
      int x [] = {30, 100, 100, 30, 50};
      int y [] = {10,  10,  70, 70, 40};
      g.drawPolygon (x, y, 5);
    }
}
```

C



```
import java.applet.*; import java.awt.*;
public class partC extends Applet {
    public void paint (Graphics g) {
        g.drawLine (20, 10, 20, 70);
        g.drawLine (20, 10, 70, 70);
        g.drawLine (70, 10, 70, 70);
    }
}
```

D



```
import java.applet.*; import java.awt.*;
public class partD extends Applet {
    public void paint (Graphics g)  {
        g.setColor (Color.blue);
        g.drawRect(60, 20, 20, 60);
        g.drawRect(40, 40, 60, 20);
    }
}
```

2. Identify the name of the first AI to master each of the following. /6

Jeopardy	Go	Video Generation	Chess	Writing	Driving
Watson	AlphaGo	Sora	DeepBlue	ChatGPT	Stanley

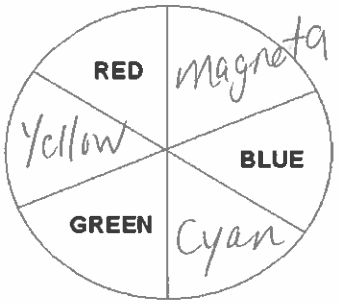
Images: Dall-E

3. Write the code required for each colour.

R G B

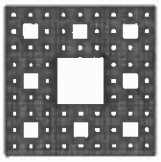
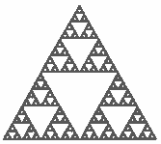
black	`title.setBackground(new Color(0, 0, 0));`
white	`title.setBackground(new Color(255, 255, 255));`
green	`title.setBackground(new Color(0, 255, 0));`
cyan	`title.setBackground(new Color(0, 255, 255));`
blue	`title.setBackground(new Color(0, 0, 255));`
magenta	`title.setBackground(new Color(255, 0, 255));`
red	`title.setBackground(new Color(255, 0, 0));`
yellow	`title.setBackground(new Color(255, 255, 0));`

4. Fill in this colour wheel using RGB colours. Use the proper colour names. /10



Communication

5. Match the fractal with its name: /6

A.  B  C  D.  E.  F 

Write the match below.

E	Tree fractal	B	Sierpinski's carpet	A	Fern fractal
D	Koch snowflake	C	T-square fractal	F	Sierpinski's gasket

6. Fill in the term that matches the descriptions given. /8

Comment	a) Code that works but doesn't run.
18	b) Moore states that hardware doubles in power every ___ months.
2045	c) The year of the singularity, according to Kurzweil and Vinge.
Method	d) A subprogram.
Avatar	e) The CGI movie that solved the uncanny valley problem.
Fractal	f) A self-referential drawing.
Exponential	g) The type of growth humans have trouble understanding.
Neurons	h) Something modelled with fractals in neuroscience.

7. Consider this method, identify the following: /5

```
public void cloud (int x, int y)
{
  Graphics g = getGraphics ();
  g.setColor (Color.blue);
  g.fillOval (x + 20, y, 30, 30);
  g.fillOval (x + 40, y + 10, 30, 20);
  g.fillOval (x + 20, y + 20, 30, 30);
  g.fillOval (x + 40, y + 20, 30, 30);
  g.fillOval (x + 10, y + 30, 20, 20);
  g.fillOval (x, y + 10, 30, 30);
}
```

(a)	The return type	void
(b)	The method name	cloud
(c)	The parameter names	x, y
(d)	The parameter type	int
(e)	Circle the method signature	☑

first time

8. Fill in the blanks to complete the following points to start a paragraph. Be clear and concise. /5

..SetColor..... is a **useful** graphics function because ..it..can..select..any..RGB..colour

..Alpha Go..... is an **innovative** form of AI because ..it..was..self-learning.....

Fractals are **useful** in CGI because ..they..create..natural..textures.....

Methods are **useful** in programming because ..they...can...repeat..shapes.....

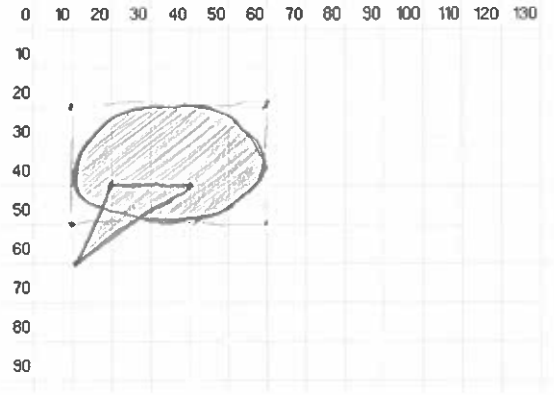
Parameters are **useful** in methods because ..they...move..shapes..to..new..co-ordinates

Application

9. Draw what is drawn by this code. Do **not** assume that the shape is drawn at 0,0 /8

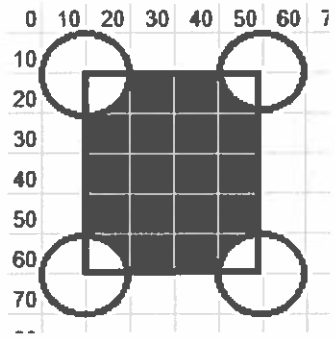
```
import java.awt.*; import java.applet.Applet;
public class sampleTest extends Applet
{
  public void paint (Graphics g)
  {   speechBubble (10, 20);
  }

  public void speechBubble (int x, int y)
  {   Graphics g = getGraphics ();
      int xs[] = {x + 10, x + 30, x};
      int ys[] = {y + 20, y + 20, y + 40};
      g.fillPolygon (xs, ys, 3);
      g.fillOval (x, y, 50, 30);
  }
}
```



X	Y	int xs[] = {x + 10, x + 30, x};	g.fillOval (x, y, 50, 30);
10	20	int xs[] = {20, 40, 10};	g.fillOval (10, 20, 50, 30);
X	Y	int ys[] = {y + 20, y + 20, y + 40};	
10	20	int ys[] = {40, 40, 60};	

10. Write the code to draw this shape on the screen. It does not need to be in a method. /7

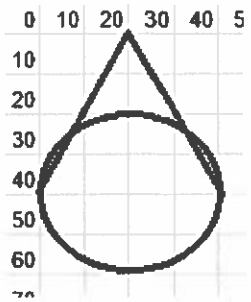



```
import java.awt.*; import java.applet.Applet;
public class sampleTest extends Applet
{
  public void paint (Graphics g) {

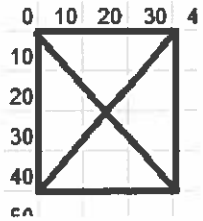
     g.setColor (Color.black);
     g.fillRect (10, 10, 40, 50);
     g.setColor (Color.white);
     g.fillOval (0, 0, 20, 20);
     g.fillOval (40, 0, 20, 20);
     g.fillOval (0, 50, 20, 20);
     g.fillOval (40, 50, 20, 20);
  }
}
```

11. Adapt each method so that it is moveable on the screen. /9

```
public void rainDrop (int x, int y, int r, int gg, int b)
{
    Graphics g = getGraphics ();
    g.setColor (new Color (r, gg, b));
    g.fillOval ( X+ 0, Y+ 20,      40,      40);
    g.setColor (Color.white);
    g.fillRect ( X+ 0, Y+ 20,      40,      20);
    g.setColor (new Color (r, gg, b));
    int xs[] = { X+20, X+ 40, X+ 0};
    int ys[] = { y+0, y+ 40, y+ 40};
    g.fillPolygon (xs, ys, 3);
}
```

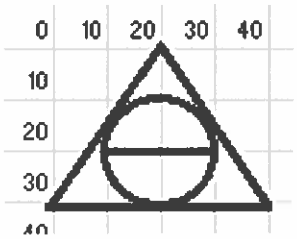



```
public void xMarksTheSpot (int x, int y)
{
    Graphics g = getGraphics ();
    g.drawRect ( X+ 0, y+ 0,     30,     40);
    g.drawLine ( X+ 0, y+ 0, X+ 30, y+ 40);
    g.drawLine ( X+ 30, y+ 0,  X+ 0, y+ 40);
}
```



Thinking

12. Circle and correct one error on each line of code. /9




```
public void crazyTriangle (int x, int y)
{
    Graphics bob = getGraphics ();
    int xs[] = {x + 20, x + 40, 0};
    int ys[] = {0, y + 30, y + 30};
    g.drawPolygon (xs, ys, 3);
    g.drawOval (x + 10,y + 10, 20, 20)
    g.drawLineShape (x + 10, y + 20, 30, 20);
}
```

13. This picture was taken in panorama mode: one continuous photo was taken while a robot rotated 360 degrees in a circle of trees. /2



Two trees in the circle were cut down. Another picture was taken moving in the same direction but starting from a different tree. Which was the second picture? (circle)

(a) 

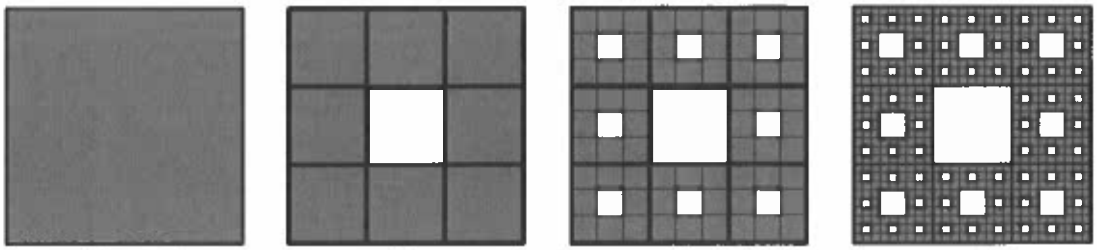
(b) 

(c) 

D E F G H A B C

(d) 

14. In this fractal, every generation divides each region into 9 squares, then removing the middle.

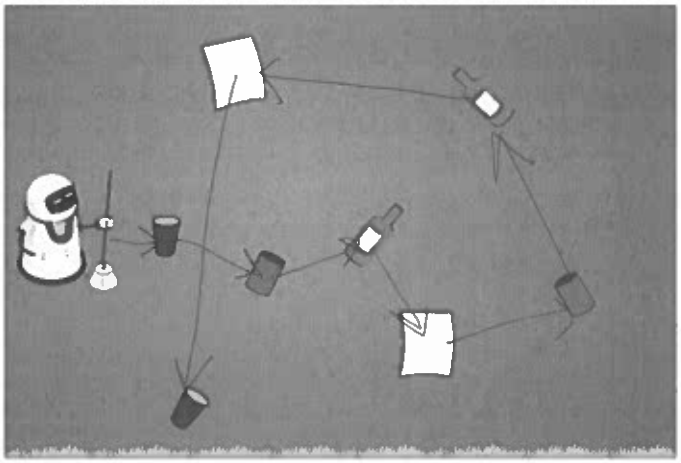


Analyse the fractal. /5

Generation	1	2	3	4	5
# of Black Squares	1 (×8)	8	64	512	4096
Area of 1 Square	6561 (÷9)	729	81	9	1
Total Area	6561	5832	5184	4608	4096

15. After an outdoor concert, a recycling robot is assigned to pick up the eight items left on the lawn. /2

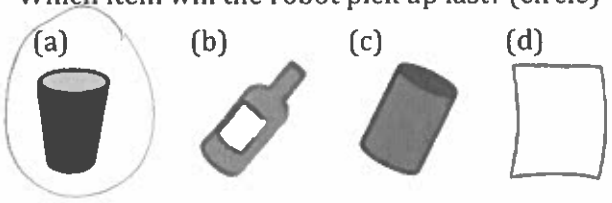
The robot starts on the left side of the lawn as shown.



The robot starts by finding the closest item. The robot then moves to this item and picks it up. Then the robot identifies the next item that is closest to the item it just picked up and moves to the new item. The robot continues this process until all the items have been picked up.

Which item will the robot pick up last? (circle)

(a) (b) (c) (d)



16. The following five images represent the letters I, T, O, C and L, respectively.



When an AI is in its learning phase, it scans an image and tries to find patterns. Instead of recording black or white at a pixel, it records how many of the other four images have the same shade (black or white) at that pixel.

For example, when scanning the image below representing the letter I, the AI records the following grid.



0	3	1
1	1	3
1	4	1

In the AI's neural network, which letter corresponds with this grid? (circle) /2

3	3	2
2	2	0
2	4	2

only one that's different in this position

(a)



(b)



(c)



(d)

