





# Unit 1 – ICS4U0 – Java Applets & Strings

Sample Test – September 19, 2023

Name: Solutions

Total	Knowledge 	Communication 	Thinking 	Application 
(100)	(23)	(22)	(20)	(35)

## Knowledge

1. Use this code to fill in the memory diagram. Then, write out what each substring prints. /4

String ooo = "oodles of whoodles";

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
o	o	d	l	e	s		o	f		w	h	o	o	d	l	e	s

(a)	System.out.println(ooo.substring(11,16));	hoodl
(b)	System.out.println(ooo.substring(14,ooo.length()));	dles
(c)	System.out.println(ooo.substring(ooo.length()/2,16));	- whoodl

$18/2=9$

2. This is the original String: String m = "miniature POODLE";

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
m	i	n	i	a	t	u	r	e		P	O	O	D	L	E

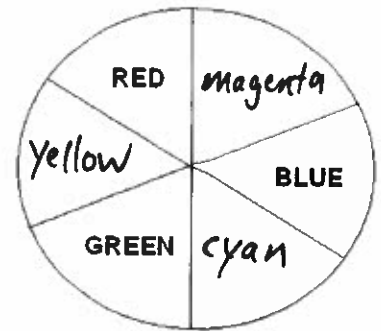
Match the code with the output. /10

g	16	a. System.out.println (m.equals ("DOG"));
i	a	b. System.out.println (m.charAt (7));
a	false	c. System.out.println (m.toLowerCase ());
f	manaature POODLE	d. System.out.println (m.substring (0, 4));
d	mini	e. System.out.println (m.replace ('O', 'E'));
e	miniature PEEdle	f. System.out.println (m.replace ('i', 'a'));
L	MINIATURE POODLE	g. System.out.println (m.length ());
c	miniature poodle	h. System.out.println (m);
h	miniature POODLE	i. System.out.println (m.charAt (4));
k	POODLE	j. System.out.println (m.compareTo ("zebra") < 0);
b	r	k. System.out.println (m.substring (10, 16));
j	true	l. System.out.println (m.toUpperCase ());

3. Write the code required for each colour.

	R	G	B	/6
black	title.setBackground(new Color( <u>0</u> , <u>0</u> , <u>0</u> ));			
white	title.setBackground(new Color( <u>255</u> , <u>255</u> , <u>255</u> ));			
green	title.setBackground(new Color( <u>0</u> , <u>255</u> , <u>0</u> ));			
cyan	title.setBackground(new Color( <u>0</u> , <u>255</u> , <u>255</u> ));			
blue	title.setBackground(new Color( <u>0</u> , <u>0</u> , <u>255</u> ));			
magenta	title.setBackground(new Color( <u>255</u> , <u>0</u> , <u>255</u> ));			
red	title.setBackground(new Color( <u>255</u> , <u>0</u> , <u>0</u> ));			
yellow	title.setBackground(new Color( <u>255</u> , <u>255</u> , <u>0</u> ));			

4. Fill in this colour wheel based on the computer colours. Use the proper colour names. /3



## Communication

5. Fill in the words that match the descriptions given.

/10

String	(a) A type of variable that holds a group of chars.
Black Box	(b) A type of testing where you don't look at the code.
ASCII	(c) An encoding technique for translating letters to binary.
Pig Latin	(d) Encryption named for an animal and the Ancient Roman language.
Mirror Writing	(e) Encryption that can be decrypted with a shiny reflective surface.
Ciphertext	(f) Text that is not easily read.
Accessor	(g) <code>getText</code> is from this phase of the widget life cycle.
Caesar Shift	(h) The military encryption technique used in Ancient Rome.
Casting	(i) The name for using <code>(int)</code> in front of a char to make it into an integer.
JButton	(j) A type of widget used for mouse input.

6. Explain how widget construction differs from mutation. (2 points)

/2

Construction sets up memory so the widget can be used.  
 FYI (It is necessary for widget variables because they are complex)  
 Mutation is changing some of the values in the widget's memory. The keyword for construction is `NEW`; the key word for mutation is `SET`.

7. Why is testing important? Provide a specific example. (2 points)

/2

Testing is important because it prevents costly errors. For example, when the Ariane 5 rocket missed testing the "average data" case for speed, and the rocket blew up seconds after take off, \$7.5 billion was lost by the ESA (European Space Agency)

8. Name each PARC principle and explain how each is broken by this app.

Proximity	there are no groups of similar elements. These should be separated with space.
Alignment	everything should follow an alignment - right or left or center - in this app, there are all sorts of alignments
Repetition	there is no unity because there are all different fonts and button styles.
Contrast	the most important thing (Baking Game = title) should be contrasted; not the SAVE button.

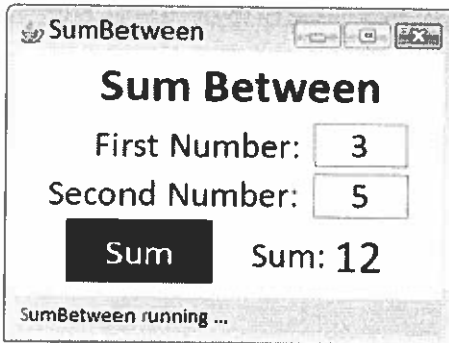


/8

## Thinking

9. White Box and Black Box test this app.

/10



Black Box Test Case	Black Box Data
Average	3, 8
Small	0.001, 0.004
Large	2000, 80000
Boundary	0, -1
White Box Test Case & line number	White Box Data
4 if (a > b)	a=8 b=2
6 else if (a == b)	a=2 b=2
8 else	a=2 b=8
10 loop once	a=2 b=3 one apart
10 loop many times	a=2 b=18 many apart

The Code:

```

1 public void actionPerformed (ActionEvent e) {
2     int a = Integer.parseInt (first.getText ());
3     int b = Integer.parseInt (second.getText ());
4     if (a > b)
5         answer.setText ("0");
6     else if (a == b)
7         answer.setText (a);
8     else {
9         int sum = 0;
10        for (int i = a ; i <= b ; i++) {
11            sum += i;
12        }
13        answer.setText (sum);
14    }
15 }

```

10. Decrypt the following messages. This chart may be useful:

/10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

5 7 7      14 15 15 4 12 5 19  
 e g g      n o o d l e s

noops a htiw netae tseb era seldooz  
 zoodles are best eaten with a spoon

oodlemay siay aay trangesay ordway  
 moodle is a strange word

qjol qppemf tljsu  
 pink poodle skirt

(Hint: qfafochryxz = celebration)

kxxkafm qbhzwf rbf wxxwaf axwx yz qfafochryxz  
 doodles change the google logo in celebration

## Application

11. This is the original String: String c = "Kit and caboodle";

/10

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
K	i	t		a	n	d		c	a	b	o	o	d	l	e

Write the code to produce the following output:

(a)	KIT AND CABOODLE	System.out.println( c.toUpperCase() );
(b)	kit and caboodle	System.out.println( c.toLowerCase() );
(c)	c	System.out.println( c.charAt(8) );
(d)	t	System.out.println( c.charAt(2) );
(e)	Kit and caboodle	System.out.println( c.replace('o', 'e') );
(f)	caboodle	System.out.println( c.substring(8, 16) );
(g)	and	System.out.println( c.substring(4, 7) );
(i)	AND	System.out.*.println( c.substring(4, 6).toUpperCase() );
(j)	16 //the length	System.out.println( c.length() );
(k)	97 //ASCII of a	System.out.println( (int) c.charAt(4) );
(h)	1 //position of i	System.out.println( c.indexOf('i') );
(h)	abc	System.out.println( c.charAt(4) + c.charAt(10) );

\* could be done in 2 lines if you want.

+ c.charAt(8)

12. Given a string, print "yes" if first 2 chars in the string also appear at the end of the string, and "no" otherwise.

/5

Example 1: Word? edited yes	Example 2: Word? edit no	Example 3: Word? abba no	Example 4: Word? lalalala yes
-----------------------------------	--------------------------------	--------------------------------	-------------------------------------

```
String s = IO.inputString("Word? ");
if (s.length() >= 2) {
    String end = s.substring(s.length() - 2, s.length());
    String start = s.substring(0, 2);
    if (start.equals(end))
        System.out.println("yes");
    else
        System.out.println("no");
}
```

13. Fill in this code to set up the screen for the matching game.

/5

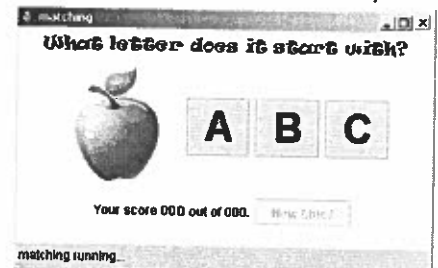
```
import javax.swing.*; import java.awt.*; import java.awt.event.*; import java.applet.Applet;
public class matching extends Applet implements ActionListener {
    JLabel score, picture;
    JButton a, b, c, pa;
    int letter = (int) (Math.random () * 3 + 1);
    int num = (int) (Math.random () * 3 + 1);
    int questions = 0;
    int right = 0;

    public void init () {
        resize (400, 210);
        JLabel title = new JLabel ("What letter does it start with?");
        title.setFont (new Font ("Ravie", Font.PLAIN, 16));
        picture = new JLabel (createImageIcon (letter + "" + num + ".jpg"));
        pa = new JButton ("New Clue?");
        pa.setBackground (Color.yellow);
        pa.setActionCommand ("new Clues"); * on the next page
        pa.addActionListener (this);
        pa.setEnabled (false);

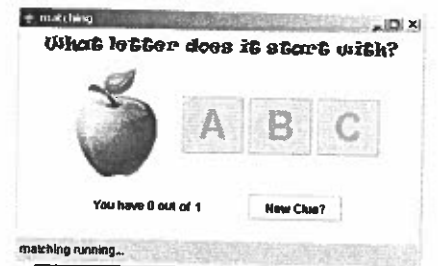
        a = new JButton ("A");
        a.setActionCommand ("1");
        a.addActionListener (this);
        b = new JButton ("B");
        b.setActionCommand ("2");
        b.addActionListener (this);
        c = new JButton ("C");
        c.setActionCommand ("3");
        c.addActionListener (this);

        score = new JLabel ("Your score 000 out of 000.");
        add (title);
        Panel p = new Panel ();
        p.add (picture);
        p.add (a);
        p.add (b);
        p.add (c);

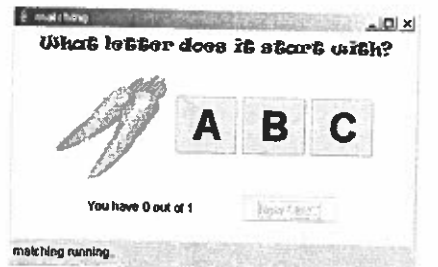
        add (p);
        add (score);
        add (pa);
    }
}
```



Opening Screen.



They picked C. That was wrong. The score & buttons changed.



New Clue was pressed.

14. Fill in the actionPerformed method for the matching applet you started in question 13.

```
public void actionPerformed (ActionEvent e){
    if (e.getActionCommand ().equals ("newQues"))
    {
        letter = (int) (Math.random () * 3 + 1);
        num = (int) (Math.random () * 3 + 1);
        picture.setIcon (createImageIcon (letter + "" + num + ".jpg"));
        pa.setEnabled (false);
        a.setEnabled (true); b.setEnabled (true); c.setEnabled (true);
    }
    else
    { // 9 lines of code here!
```

```
int guess = Integer.parseInt (e.getActionCommand ());
if (guess == right letter)
    right++;
questions++;
score.setText ("You have " + right + " out of " + questions);

pa.setEnabled (true);
a.setEnabled (false);
b.setEnabled (false);
c.setEnabled (false);
```



15. Use the string that the user has entered. It will have no capital letters – only small letters or numbers. Separate it into two Strings, one with numbers, one with small letters, which are printed on the screen.

Example 1: Word? abc123 abc 123	Example 2: Word? h2i34 hi 234	Example 3 Word? yyyy yyyy	Example 4 Word? 1ttt23 ttt 123
--	--	---------------------------------	---

```
String s = IO.inputString("Enter a string of numbers and letters: ");
s=s.toLowerCase();
```

```
String nums = "";
String letters = "";
for (int i=0; i < s.length(); i++) {
    int val = (int) (s.charAt(i));
    if (val >= 97 && val <= 122)
        letters += s.charAt(i);
    else
        nums += s.charAt(i);
}
System.out.println (letters + "\n" + nums);
```