Unit 1 – ICS4U0 – Java Applets & Strings

Sample Test – February 11, 2026

Name: Gorski

Total	Knowledge	Communication	Thinking	Application
(100)	(24)	(21)	(21)	(34)

Knowledge

1. This is the original String:

```
String r = "Roronoa Zoro";
```

0	1	2	3	4	5	6	7	8	9	10	11
R	o	r	o	n	o	a		Z	o	r	o

/10

Match the code with the output.

i	8		a. System.out.println (r.length ());
a	12		b. System.out.println (r.charAt (0));
c	97		c. System.out.println ((int) r.charAt (6));
m	true		d. System.out.println (r.charAt (r.length () - 1));
n	false		e. System.out.println (r.charAt (4) + "" + r.charAt (0));
j	a Zo		f. System.out.println (r.toUpperCase ());
e	nR		g. System.out.println (r.toLowerCase ());
d	o		h. System.out.println (r.replace ('o', 'y'));
L	on		i. System.out.println (r.indexOf ('Z'));
b	R		j. System.out.println (r.substring (r.length () / 2, 10));
k	Ro		k. System.out.println (r.substring (0, 2));
f	RORONOA ZORO		l. System.out.println (r.substring (3, 5) + r.substring (7, 8));
h	Ryrynya Zyry		m. System.out.println (r.compareTo ("Blackbeard") > 0);
g	roronoa zoro		n. System.out.println (r.equals ("Nami"));

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

/5

```
String x = "Straw Hat Pirates";
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
S	t	r	a	w		H	a	t		P	i	r	a	t	e	s

(a)	`System.out.println (x.substring (0, 5));`	Straw
(b)	`System.out.println (x.substring (10, x.length ()));` (17)	Pirates
(c)	`System.out.println ( x.substring (x.indexOf ('a'), x.length () / 2));` (3, 8)	aw Ha

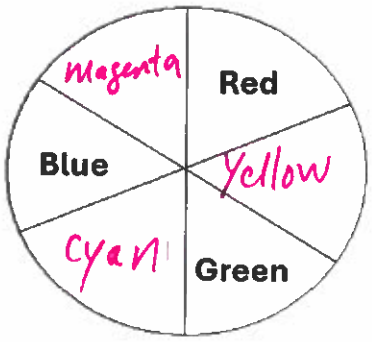
first a

17/2 = 8 chop off decimal

3. Write the code required for each colour. /6

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

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.
charAt	(b) A String method that returns a char.
Brute Force	(c) An attack that can break a Caesar shift.
ASCII	(d) An encoding technique for translating letters to binary.
Pig Latin	(e) Encryption named for an animal and the Ancient Roman language.
Mirror Writing	(f) Encryption that can be decrypted with a shiny reflective surface.
Cipher text	(g) A general term for text that is not easily read.
Black Box	(h) A type of testing where you don't look at the code.
indexOf	(i) The opposite String function to charAt.
JButton.	(j) A type of widget used for mouse input.

6. Why is testing important? Provide a specific example. (3 points, at least 3 sentences) /3

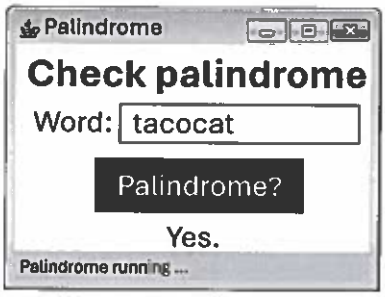
① Testing is important because it prevents costly errors.
② For example, in 1996, the ESA agency launched the Ariane 5 rocket which exploded 40 second after takeoff.
③ Because they forgot to Black Box test "large values" for speed, the ESA lost a rocket worth $7.5 billion. A very expensive mistake.

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

P Proximity	There are no groups of similar items (eg buttons, pictures) seperated with a space
A Alignment	Everything should follow 1 alignment (Right, Left or center). In this app many alignments are used.
R Repetition	there is no unity because there are all sorts of different fonts, image styles and button styles.
C Contrast	The most important thing (the title - choose your favourite character) should be contrasted to draw your eye first.

Thinking

8. White Box and Black Box test this app. /9



A palindrome is a word that reads the same backward as forward.

For example "racecar" or "nurses run".

Word	Black Box Test Case
a	small
computer	average
antidisestablishmentarianism	large
@!24A	boundary
Word	**White Box Test Case & Line Number**
[empty string]	Avoid the loop, Line 4
I	Loop once, Line 4
banana split	Loop many times, Line 4
tacocat	Is a palindrome, Line 6
frog	Isn't a palindrome, Line 8

```
1   public void actionPerformed (ActionEvent e){
2         String s = input.getText();
3         String rev = "";

4         for (int i = s.length () - 1 ; i >= 0 ; i--)
5             rev += s.charAt (i);

6         if (rev.equals (s))
7             output.setText ("Yes");
8         else
9             output.setText ("No");
10  }
```

9. Decrypt the following messages. This chart may be useful: /12

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

kpmmz sphfs (caesar)
jolly roger

draebkcalb (mirror writing)
blackbeard

iratepay hipsay (pig latin)
pirate ship

15 14 5 16 9 5 3 5 (number code)
o n e p i e c e

Hint: lagiwm vfal = pirate ship, Hint #2: All punctuation ', . is at it appears.

wfm fillamvw lagiwm ligwamv rmig wfmag vfal'v lamg.
the happiest pirate parties near their ship's pier.

wfmo prmigwfmb wfmag fmigw'v bmvagm, i villfagm.
they unearthed their heart's - desire, a sapphire.

Application

10. This is the original String: `String p = "King of the Pirates";` /10

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
K	i	n	g		o	f		t	h	e		P	i	r	a	t	e	s

Write the code to produce the following output:

(a)	KING OF THE PIRATES	System.out.println(p.toUpperCase());
(b)	king of the pirates	System.out.println(p.toLowerCase());
(c)	g	System.out.println(p.charAt(3));
(d)	Kyng of the Pyrates	System.out.println(p.replace('i', 'y'));
(e)	rates	System.out.println(p.subString(14, 19));
(g)	19 //the length	System.out.println(p.length());
(h)	110 //ASCII of n	System.out.println((int) p.charAt(2));
(i)	6 //position of f	System.out.println(p.indexOf('f'));
(j)	thing	System.out.println(p.substring(8,10) + p.substring(1,4));
(k)	KING	System.out.println(p.toUpperCase().substring(0,4));

11. Make a loop that prints out a word one letter on each line, alternating between upper and lower case as shown in the examples. The initial word might be in upper or lower case. The 0th letter is in uppercase.

If nothing (an empty String) is entered, the result is the word "nothing". This occurs in example 2.

/8

Example 0: Word? **nnnn** Result: N n N n	Example 1: Word? **a** Result: A	Example 2: Word? Result: nothing	Example 3 Word? **luffy** Result: L u F f Y	Example 4 Word? **FROGbananA** Result: F r O g B a N a N a

```
String s = IO.inputString("Word?");
System.out.println("Result: ");
//handle the case shown in example 2
if(s.equals(""))
     System.out.println("nothing");
else{
    //switch s to capitals, store in up
    String up = s.toUpperCase();
    //switch s to small letters, store in low
    String low = s.toLowerCase();

    for (int i=0; i<s.length(); i++) {
        if (i % 2 == 0)
            System.out.println(up.charAt(i));
        else
            System.out.println(low.charAt(i));
    }//for loop
}//else
```

Hint: `x%2 == 0` is true if x is an even number.

12. (a) Fill in init for the Encryption App (shown in on the right)

```
import java.awt.*; import javax.swing.*; import java.applet.Applet; import java.awt.event.*;
public class Encrypt extends Applet implements ActionListener
{
    JTextField word;
//The other global variable:
    JLabel output;
    public void init ()
    {  resize (300, 100);
//The first label: (Font is Arial, Font.BOLD and 30 pt)
    JLabel title = new JLabel("Encryption");
    title.setFont(new Font("Arial",Font.BOLD,30));
//The prompt
    JLabel pmt = new JLabel("Word:");
//The textfield:
    word = new JTextField(8);
//The button: (Black background, white writing)
    JButton b = new JButton("Encrypt it!");
    b.setBackground(Color.black);
    b.setForeground(Color.white);
    b.addActionListener(this);
    b.setActionCommand("clicked");
//The last label:
    output = new JLabel("Enter a word:");
//add the widgets:
    add(title);
    add(pmt);
    add(word);
    add(b);
    add(output);
} //init
```

(b) Fill in the Encryption App's actionPerformed using the comments.

/16

```
public void actionPerformed (ActionEvent e)
{
  if(e.getActionCommand().equals("clicked")
  {
    String s = word.getText();
    //switch it to lowercase
    s = s.toLowerCase()
    //replace all 'a' with '@'
    s = s.replace('a','@');
    //replace all 'e' with '$'
    s = s.replace('e','8');
    //chop the string in half
    String first = s.substring(0,s.length()/2);
    String last = s.substring(s.length()/2,s.length());
    //switch the order of the two halves
    s = last + first;

    //output the s variable on the screen in the JLabel
    output.setText(s);
  } //if
 } //actionPerformed
} //Applet
```