

Unit 1 – ICS4U0 – Java Applets & Strings

Sample Test – September 16, 2025

Name: Gorski

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

Knowledge

1. This is the original String:
String b = "BasketBALL";

0	1	2	3	4	5	6	7	8	9
B	a	s	k	e	t	B	A	L	L

/10

Match the code with the output.

* Note: Use this to help with question #10

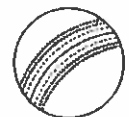
h	10	a. System.out.println ((int) b.charAt (1));
f	2	b. System.out.println (b.charAt (0));
g	0	c. System.out.println (b.charAt (5));
a	97	d. System.out.println (b.compareTo ("hockey") < 0);
m	BASKETBALL	e. System.out.println (b.equals ("hockey"));
L	basketball	f. System.out.println (b.indexOf ('s'));
i	BasketBAMM	g. System.out.println (b.indexOf ('B'));
e	false	h. System.out.println (b.length ());
d	true	i. System.out.println (b.replace ('L', 'M'));
b	B	j. System.out.println (b.substring (0, 4));
c	t	k. System.out.println (b.substring (0, 1) + b.substring (4, 9));
j	Bask	l. System.out.println (b.toLowerCase ());
K	BetBAL	m. System.out.println (b.toUpperCase ());
n	BB	n. System.out.println ("" + b.charAt (0) + b.charAt (0));

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

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String f = "cricket and soccer";

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
c	r	i	c	k	e	t		a	n	d		s	o	c	c	e	r



(a)	System.out.println (f.substring (0, 5));	crick
(b)	System.out.println (f.substring (13, <u>18</u> f.length ()));	occer
(c)	System.out.println (f.substring (<u>4</u> f.length () / 4, <u>7</u> f.indexOf (' ')));	ket

$18/4 = 4$
chop off decimal

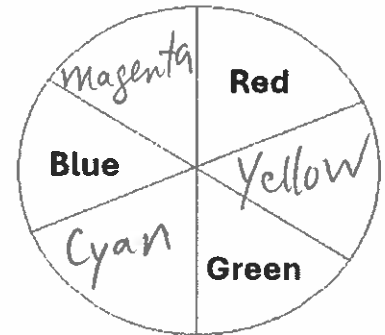
3. Write the code required for each colour.

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

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Communication

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

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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) 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 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)

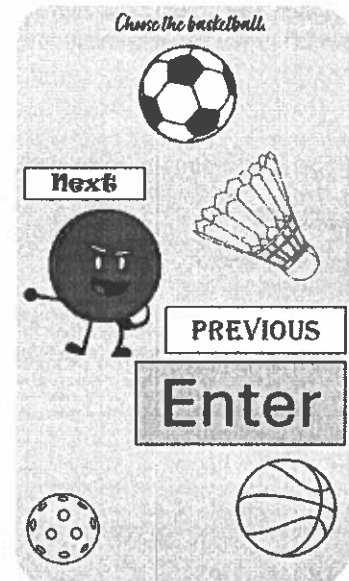
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see Testing sheet, last question

1. In 1996, the Ariane 5 ESA rocket exploded 40 seconds after take off, costing \$7.5 billion.
2. This occurred because the average case black box test case for speed was not tested.
3. This example shows us that testing errors can be very expensive.

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

Proximity	The similar things (group 1 - buttons, group 2 - sports equip) should be together in a group, spaced from others.
Alignment	All items in the screen should be right, left, or centre aligned. They are placed randomly instead.
Repetition	① 4 different fonts appear - should only be one. ② All different styles of pictures are used. ③ Buttons are all different
contrast	The Enter Button is contrasted (it is large) but it isn't important. The title (choose basketball) should be large.

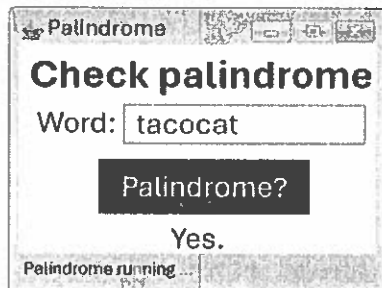


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Thinking

8. White Box and Black Box test this app.

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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 data
banana	average data
antidisestablishmentarianism	large data
\$!\$	boundary case data
Word	White Box Test Case & Line Number
[empty string]	avoid loop (#4)
b	loop once (#4)
alligator	loop many times (#4)
tacocat	go into if [is palindrome] #6
ciphertext	go into else [not palindrome] #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:

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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

cbtlfucbmm ofu
basketball net

← enozdne llabtoof
football endzone

ockeyhay katessay
hockey skates

3 18 9 3 11 5 20
c r i c k e t

Hint: vgmcfvrgzz = basketball, Hint #2: All punctuation ', . is at it appears.

rgcf g mfrgr gke y'zz rfzz opt g rgzff gzz
take a seat and I'll tell you a tale all

gvptr vgzzfr, vgmcfvrgzz gke vgmfvrgzz.
about ballet, basketball and baseball.

Application

10. This is the original String: String h = "hockey SKATES";

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0	1	2	3	4	5	6	7	8	9	10	11	12
h	o	c	k	e	y		S	K	A	T	E	S

Write the code to produce the following output:

(a)	HOCKEY SKATES	System.out.println(h.toUpperCase());
(b)	hockey skates	System.out.println(h.toLowerCase());
(c)	A	System.out.println(h.charAt(9));
(d)	hockey PKATEP	System.out.println(h.replace('S', 'P'));
(e)	hockey	System.out.println(h.substring(0,6));
(g)	13 //the length	System.out.println(h.length());
(h)	104 //ASCII of h	System.out.println((int) h.charAt(0));
(i)	2 //position of c	System.out.println(h.indexOf('c'));
(j)	STATE	System.out.println(h.substring(7,12).replace('K', 'T'));
(k)	ok	System.out.println(h.charAt(1) + h.charAt(3));

11. Make a loop to count number of times cat appears in a string. The letters should be all lowercase.

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Example 1: Word? catdogcatcattur nip 3 cat(s)	Example 2: Word? c 0 cat(s)	Example 3 Word? cahatmatsatac 0 cat(s)	Example 4 Word? tacocat 1 cat(s)
---	-----------------------------------	--	--

```
String s = IO.inputString("Word? ");
```

```
//Make s lowercase:
```

```
s = s.toLowerCase();
```

```
//if less than 3 characters, print error message
```

```
if( s.length() < 3 )
```

```
{
    System.out.println( 0 cat(s) );
}
```

or Error ... my mistake in output above

```
//else count cat
```

```
else
```

```
{
```

```
    //set up variable to hold count
```

```
    int count = 0;
```

```
    //loop only to the character which is 3 from the end
```

```
    for( int i=0 ; i < s.length() - 2 ; i++ )
```

```
{
```

```
        //check three places in a row for c, a, t
```

```
        if( s.charAt(i) == 'c' && s.charAt(i+1) == 'a' ,
```

```
            && s.charAt(i+2) == 't' )
```

```
{
```

```
            count++;
```

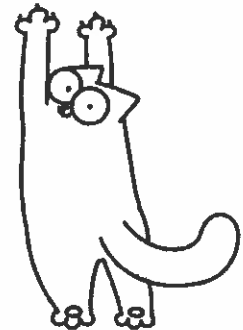
```
}
```

```
}
```

```
//print results
```

```
System.out.println( count + "cat(s)" );
```

```
}
```



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 (X);

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(" (Y) ");

//The last label:

(X) = new JLabel("Enter a word");

//add the widgets:

add(title);

add(pmt);

add(word);

add(b);

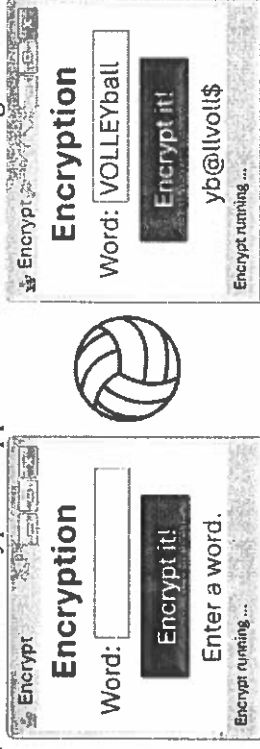
add((X));

} //init

Note (X) and (Y)
can be anything
but they must
match.

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

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public void ActionPerformed (ActionEvent e)

{ if(e.getActionCommand().equals((Y))

{ String s = word .getText();

//switch it to lowercase

s = s.toLowerCase();

//replace all 'a' with 'e'

s = s.replace('a', 'e');

//replace all 'e' with 's'

s = s.replace('e', 's');

//chop the string in half

String first = s.substring(0, s.length()/2);

String last = s.substring(s.length()/2, s.length());

//switch the two halves

s = last + first;

//output on the screen

(X) .setText(s);

} //if

} //actionPerformed

} //Applet