Practice Exam #1

Practice Exam prepared by Bruce McKenzie and Mike O’Malley of Central Queensland University.

Instructions to the Student

Perusal time: 15 minutes
Examination duration: 180 minutes (3 hours)
Total Exam Marks: 65

Part A: Contains 50 multiple choices questions worth one-half mark each. Answer as many questions as you can.

Part B: Contains 2 questions, each consisting of multiple parts that are worth between 1 and 6 marks. Answer as many questions as you can.

Please write all of your answers on paper so that you get practice doing this before the real exam. Ensure that all of your answers are clearly labelled to indicate which question they belong to.

Please Note:

- This Practice Exam is harder **AND** longer than a real exam. This is intentional, because it eliminates the possibility of any "the practice exam was easier than the real exam" arguments.

- Treat this Practice Exam like a real exam – print it out, put a "do not disturb" sign on your door, **turn off your phone**, and give yourself a block of 3 hours to work through the exam.

- Solutions to Practice Exams will **NOT** be made available to students.

- Check your answers by comparing and discussing your answers with other students, for example, on the Course Mailing List, and/or by converting them to Java (if required) and typing them into TextPad and testing them.
Part A

Answer as many questions as you can. Each correct answer is worth 0.5 marks.

1. Programmers use the ____ class to format decimal numbers into Strings for output.
   A). Float  
   B). DecimalFormatSymbols  
   C). Format  
   D). DecimalFormat

2. ____ means that a programmer can use a class, along with its methods and data, to
   create a subclass, which saves time and coding.
   A). Aggregation  
   B). Inheritance  
   C). Encapsulation  
   D). Polymorphism

3. ____ is the capability of an object to have data and functionality available to the
   user, without the user having to understand the implementation within the object.
   A). Encapsulation  
   B). Aggregation  
   C). Inheritance  
   D). Polymorphism

4. In object-oriented terminology, the characteristics of an object are defined by its
   ____.
   A). Attributes  
   B). Class  
   C). Instance  
   D). Methods

5. The ____ component adds a command to a previously declared menu.
   A). Menu  
   B). MenuBar  
   C). MenuItem  
   D). MenuCommand

6. After this Java statement is executed: System.out.println("\nABC\t123\n"); What
   would the output be on the console screen?
   A). A blank line followed by ABC, a series of spaces, 123, and another blank line.
   B). ABC123
   C). A blank line followed by ABC, a blank line, a series of spaces, 123, and another
      blank line.
   D). Something else.
7. The ____ method is triggered when a user clicks a checkbox in a CheckboxGroup.
   A). addItemListener()
   B). itemStateChanged()
   C). getState()
   D). setState()

8. Which of the following is not a Java comparison operator?
   A). =
   B). <=
   C). !=
   D). >

9. The main() method of a Windowed Application is responsible for ____.
   A). adding the ActionListeners
   B). declaring and initializing the Frame components
   C). constructing an instance of the Application
   D). setting up the menu system

10. A(n) ____ is a small Java program that can be downloaded and executed as part of a displayed Web page.
    A). Applet
    B). Servlet
    C). GUI Application
    D). Console Application

11. The getText() method can retrieve text from any of the following AWT components except ____.
    A). Label
    B). TextField
    C). Button
    D). TextArea

12. Which of these is a valid main method for a Java Console Application
    A). public static void main ()
    B). public void main (String[] args)
    C). int main ()
    D). public static void main (String[] args)

13. An ____ can be added to an Applet to listen for when the user clicks components such as check boxes.
    A). ActionListener
    B). EventListener
    C). MouseListener
    D). ItemListener
14. Which of the following is a valid condition for an if statement? Assume the variable "done" is a boolean.
   A). (done=true)
   B). (done == "false")
   C). (done == false && done)
   D). ((done == false) || (done == true))

15. Which of the following Java statements would NOT display "x,y_z 33.44" to the Console screen?
   A). System.out.print("x" + "y_z 33.44");
   B). System.out.print("x,y" + "_z " + 33 + "." + "44");
   C). System.out.print("x,y" + "_" + "z " + 33 + "." + 44);
   D). System.out.print("x,y" + "_z " + "33.44");

16. The ____ method assigns a caption or String to an object.
   A). add()
   B). println()
   C). setText()
   D). setForeground()

17. A missing semicolon at the end of a Java statement (that requires one) is an example of a ____ error.
   A). logic
   B). run-time
   C). semantic
   D). syntax

18. Programmers might create a diagram, called a(n) ____, which graphically represents the logic used to develop an algorithm.
   A). flowchart
   B). class diagram
   C). event diagram
   D). operation diagram

19. A ____ error is an error that changes the meaning of the code.
   A). logic
   B). syntax
   C). semantic
   D). system

20. ____ is a package that provides classes to support system / console input and output.
   A). java.lang
   B). java.io
   C). java.util
   D). javax.swing
21. A key principle of ____ is that a class should reveal to the user only what has to
be revealed and no more.
A). abstraction
B). aggregation
C). encapsulation
D). polymorphism

22. The ____ is used to store any truncated remainder value from integer division.
A). cast operator
B). integer division operator
C). precedence operator
D). modulus operator

23. The ____ class is the default layout manager for Panels and Applets.
A). BorderLayout
B). CardLayout
C). FlowLayout
D). GridLayout

24. Which of these is NOT a valid main method for a Java Console Application
A). public static void main (String args)
B). public static void main (String[] args)
C). public static void main (String args[])
D). public static void main (String freds[])

25. Which of the following is not a requirement for method arguments and their
respective parameters?
A). There must be the same number of arguments as parameters.
B). An argument and its respective parameter must have the same identifier name.
C). The arguments must be in the same order as the parameters.
D). Each argument must be of the same data type as its respective parameter.

26. The ____ statement identifies a block of statements that may potentially throw an
exception.
A). try
B). catch
C). finally
D). throw

27. The majority of the logic in a GUI Calculator application would take place in the
____, which the program uses to listen for and respond to the user clicking
button(s).
A). Calculator constructor
B). main() method
C). setActionCommand() method
D). ActionListener event
28. A(n) ____ is a location in computer memory that can change values as the code executes.
   A). argument
   B). constant
   C). parameter
   D). variable

29. Which of the following is NOT a valid array declaration?
   A). int arrayName = new int[100];
   B). int[] arrayName;
   C). int[] arrayName = new int[100];
   D). int arrayName[];

30. Which of these best describes TextPad?
   A). A great way to keep notes about program design.
   B). I don't know, I haven't installed it yet.
   C). A Notepad replacement.
   D). A very simple editor with support for Java development.

31. Which of the following is not a reference type in Java?
   A). array
   B). Date
   C). String
   D). float

32. The drawString () method accepts all of the following arguments except a ____.
   A). horizontal coordinate
   B). String
   C). vertical coordinate
   D). Graphics object

33. A Java class with the declaration "public class studentResults_T2" should be stored in a file called:
   A). STUDENTRESULTS_T2.java
   B). studentresults_t2.java
   C). All answers are correct.
   D). studentResults_T2.java

34. After this Java statement is executed:  int i3 = (int) 20.0 / (19 % 7);  What value would be held in the variable i3?
   A). Other
   B). 2
   C). 4
   D). 3
35. A(n) ____ language is a language that has a compact set of commands without numerous versions or adaptations of the same command.
   A). Portable
   B). Robust
   C). Parsimonious
   D). Secure

36. In a CheckboxGroup, a special ____ CheckBox can be included and set to true to clear all the other CheckBoxes visible in the user interface.
   A). default
   B). hidden
   C). secret
   D). static

37. The Java ____ class implements the system clipboard to transfer data in and out of the clipboard.
   A). SystemClipboard
   B). Toolkit
   C). Clipboard
   D). Transferable

38. The ____ method returns the most recent value of the system clipboard provided by the native platform.
   A). getDefaultToolkit()
   B). getContents()
   C). getSystemClipboard()
   D). getTransferData()

39. A(n) ____ deals with mouse clicks on the buttons and menus during the execution of a program.
   A). ItemEvent
   B). ActionListener
   C). ItemListener
   D). WindowListener

40. Indentation rules are part of a programmer's ____ convention.
   A). class
   B). coding
   C). language
   D). naming

41. A(n) ____ is a good way to verify that menu titles and shortcut keys satisfy user needs.
   A). flowchart
   B). object structure diagram
   C). prototype
   D). menu storyboard
42. Which of the following Java conditional statements is valid?
A). if ((Age > 12) && (Age < 20) && (Sex = "M"))
B). if ((Age > 12) && (Age < 20) && (Sex == "M"))
C). if ((Age > 12) AND (Age < 20))
D). if ((Age > 12) OR (Age < 20))

43. A Java class with the declaration "public class studentResults_T2" should be stored in a file called:
A). STUDENTRESULTS_T2.java
B). studentresults_t2.java
C). studentResults.T2.java
D). studentResults_T2.java

44. A(n) ____ indicates that an operation attempted to use a number with an illegal format.
A). IllegalFormatException
B). NumberFormatException
C). NullPointerException
D). OperationException

45. Which of the following terms would NOT describe Java?
A). Parsimonious
B). Robust
C). Self Testing
D). Secure

46. The code for a class and method must be enclosed within:
A). Brackets ( )
B). Square Brackets [ ]
C). Braces { }
D). Delimiters /* */

47. In object-oriented terminology, the behaviour of an object are defined by its ___
A). Methods
B). Attributes
C). Class
D). Instance

48. A(n) ____ is the term used to describe a class that instantiates other classes and calls appropriate methods.
A). external class
B). instance class
C). driver class
D). superclass
49. The ____ is an object that implements the WindowListener interface.
   A). WindowEvent
   B). WindowObject
   C). EventHandler
   D). WindowAdapter

50. A file called "aBe_123.java" would contain a class with the declaration:
   A). public class aBe_123.java
   B). public class ABC_123
   C). public class abc_123
   D). public class aBe_123
**Part B Question 1**  
(20 marks)

a) (3 marks)

Find eight (8) compilation / syntax errors in the following Java Applet, and list the line numbers where the errors occur, what the error(s) is for that line, and what change(s) are required to fix each of the error(s).

<table>
<thead>
<tr>
<th>Line Num.</th>
<th>Java Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><code>import java.applet.*;</code> // For Applet support</td>
</tr>
<tr>
<td>2.</td>
<td><code>import java.awt.*;</code> // For GUI components</td>
</tr>
<tr>
<td>3.</td>
<td><code>import java.awt.event.*;</code> // For event handling</td>
</tr>
<tr>
<td>4.</td>
<td><code>public class Wages extends Frame implements ActionListener</code></td>
</tr>
<tr>
<td>5.</td>
<td><code>{</code></td>
</tr>
<tr>
<td>6.</td>
<td><code>/* Declare class data. */</code></td>
</tr>
<tr>
<td>7.</td>
<td><code>int Hours, Rate;</code></td>
</tr>
<tr>
<td>8.</td>
<td><code>double Gross;</code></td>
</tr>
<tr>
<td>9.</td>
<td><code>*/</code></td>
</tr>
<tr>
<td>10.</td>
<td><code>// Construct GUI Components</code></td>
</tr>
<tr>
<td>11.</td>
<td><code>Label Window_Title_Label = new Label (&quot;Gross Pay Calculator&quot;);</code></td>
</tr>
<tr>
<td>12.</td>
<td><code>Label Hours_Label = new Label (&quot;Enter Hours Worked:&quot;);</code></td>
</tr>
<tr>
<td>13.</td>
<td><code>Label Rate_Label = new Label (&quot;Enter Hourly Rate:&quot;);</code></td>
</tr>
<tr>
<td>14.</td>
<td><code>Label Output_Label = new Label (&quot;Enter values and click 'Calc'&quot;);</code></td>
</tr>
<tr>
<td>15.</td>
<td><code>TextField Hours_TextField = new TextField (20);</code></td>
</tr>
<tr>
<td>16.</td>
<td><code>TextField Rate_TextField = new TextField (20);</code></td>
</tr>
<tr>
<td>17.</td>
<td><code>Button Calc_Button = new Button (&quot;Calc&quot;);</code></td>
</tr>
<tr>
<td>18.</td>
<td><code>public Wages ()</code></td>
</tr>
<tr>
<td>19.</td>
<td><code>{</code></td>
</tr>
<tr>
<td>20.</td>
<td><code>setForeground (Colour.blue);</code></td>
</tr>
<tr>
<td>21.</td>
<td><code>add (Window_Title_Label);</code></td>
</tr>
<tr>
<td>22.</td>
<td><code>add (Hours_Label);</code></td>
</tr>
<tr>
<td>23.</td>
<td><code>add (Hours_TextField);</code></td>
</tr>
<tr>
<td>24.</td>
<td><code>add (Rate_Label);</code></td>
</tr>
<tr>
<td>25.</td>
<td><code>add (Rate_TextField);</code></td>
</tr>
<tr>
<td>26.</td>
<td><code>add (Calc_Button);</code></td>
</tr>
<tr>
<td>27.</td>
<td><code>add (Output_Label);</code></td>
</tr>
<tr>
<td>28.</td>
<td><code>Calc.addActionListener();</code></td>
</tr>
<tr>
<td>29.</td>
<td><code>}</code></td>
</tr>
<tr>
<td>30.</td>
<td><code>public void itemStateChanged (ActionEvent e)</code></td>
</tr>
<tr>
<td>31.</td>
<td><code>{</code></td>
</tr>
<tr>
<td>32.</td>
<td><code>Hours = Integer.parseInt(Hours_TextField.getText());</code></td>
</tr>
<tr>
<td>33.</td>
<td><code>Rate = Integer.parseInt(Rate_TextField.getText());</code></td>
</tr>
<tr>
<td>34.</td>
<td><code>Gross_Pay = Hours * Rate;</code></td>
</tr>
<tr>
<td>35.</td>
<td><code>Output_Label.setText (&quot;Gross Pay = &quot; + Gross_Pay);</code></td>
</tr>
<tr>
<td>36.</td>
<td><code>}</code></td>
</tr>
</tbody>
</table>
b) (2 marks)

A char variable gender has been declared which depicts if a person is male or female, possible values are: ‘m’ or ‘f’. Another variable of type integer age has been declared and holds a person’s age.

Assume input has been validated. Write if statements in Java to output to a Label called descriptionLabel (already declared): “Male child” (0 – 12), “Male teenager” (13 – 17), “Male adult” (18+), “Female child”, “Female teenager” or “Female adult”.

Hint: Use a temporary String object to make/hold the string.

c) (2 marks)

The following pseudo-code validates user input, draw this as a flow chart.

Accept age from user
WHILE age < 0 OR age > 120
  Output error message
  Accept age from user
END WHILE

d) (2 marks)

A method String getName() exists which accepts a string from the user, another method void processName(String name) exists to process the string. Write a while loop to process the string until a sentinel value “stop” is entered.

Declare and use any temporary variables you might need.

e) (2 marks)

An array of integers called numbers[] has been declared and initialised.

\[
\text{e.g.} \quad \text{int numbers[]} = \{1, 2, 4, 5, 6, 7, 3, 9\};
\]

Write the Java code to add up the array of numbers with a for loop, calculate the average, and then display the total and the average in a label called Out_Label.
f) (2 marks)

Write the following code in Java:

Declare a label of twenty characters called nameLabel.
Declare a panel called infoPanel.
Add nameLabel to infoPanel

A text box nameField will accept the user’s name (already declared).

Also write just the java code to transfer the name in nameField to nameLabel.

g) (3 marks)

Trace the execution of the following pseudo-code:

```
int number = 1
int loc = 3
Double fluff = 3.3

WHILE number < 9
    if (number > fluff)
        number = fluff + 1
    else
        number = fluff + 2
    
    loc = number - 1
    fluff = fluff * 1.2

    OUTPUT SData [loc] ","
END WHILE
```

Assume the pseudo code is for a console application and that OUTPUT displays output to the console screen.

Write down what the output of the above pseudo-code would be, and show any working you used to determine this. Also, how many iterations of the WHILE loop are performed?

*Hint:* Draw a multi-column table to keep track of important fields at key times, such as at the start and end of loops, and the results of any important calculations.
h) (2 marks)

Convert the pseudo-code in the question above to Java code. The Java code must **not** invoke any methods.

i) (2 marks)

Two text boxes are available `litresField` and `kilometresField` to receive input from the user.

Write `try throw catch` block(s) in Java to convert the strings in the text boxes to the data members `litres` and `kilometres` which are both double.

The input needs to be validated for bad input (non numeric characters) and litres need to be between 0 and 80 and kilometres between 0 and 1,000.

Output an appropriate swing error message dialog for both litres and kilometres.

Do not worry about processing the correct input.
Part B Question 2  (20 marks)

a) (4 marks)

Write a complete Java console application to prompt the user to enter a dollar amount and a price per litre in cents for petrol.

The program will calculate the number of litres which can be bought for the dollar amount specified.

The number of litres which can be bought will be displayed to two decimal places.

Assume correct data will be entered (no data validation is necessary).

Call the class Bowser.

b) (3 marks)

Declare an array of Strings called sizes which has the contents “Small”, “Medium” and “Large”, also declare a drop down combo box (choice component) and populate it with the array of Strings.

Write a piece of code to output either Small, Medium or Large to a label (already declared) called sizeLabel depending on the choice.

Just write the necessary code without any regard to where the statements will be placed.

c) (3 marks)

Write the Java code to declare an array of four command buttons called codeButtons. They will be labelled “1”, “2”, “3” and “4”;

A panel codePanel has been declared to display the buttons.

Write a for loop to initialise the buttons with their numbered labels, also they need to be added to codePanel and activated.
d) (3 marks)

An array of colours has been declared:

```
Color RGB [] = {Color.red, Color.green, Color.blue};
```

Also an array of buttons rgbButtons labelled “Red”, “Green” and Blue” has been declared and activated.

Write the Java code to implement the abstract method `actionPerformed(ActionEvent e)`. You will need to check which button has been pushed and set a panel `colourPanel` (already declared and added) to the corresponding colour.

e) (3 marks)

If the following code is executed in a Java Windowed Application program:

```java
this.setLayout (new BorderLayout ());
Button Button1 = new Button ("Button1");
Button Button2 = new Button ("Button2");
Button Button3 = new Button ("Button3");
add (Button1, BorderLayout.NORTH);
add (Button2, BorderLayout.CENTER);
add (Button3, BorderLayout.NORTH);
```

and no other GUI components are added, then what will the user of the application see when it is executed? Explain your answer.

Assume that all of the components have been declared properly and that all of the required code is in place to display the Java Windowed Application.
f) (3 marks)

Assume that eight buttons have already been declared and set-up in an array called Nice.Buttons.

Write the Java code necessary to:

- Declare a panel, called Button_Panel, which uses a appropriate layout manager to display the buttons in 2 rows and 4 columns. The buttons should be separated by a 5 pixel gap.

- Add the buttons to this panel so that they are nice sized buttons (rather than BIG buttons that have expanded to fill the area they are added to).

- If any other components, panels, or arrays, etc are needed, then write the Java code to declare, initialise, and set these up.

g) (1 marks)

Java has built-in Garbage Collection. Briefly, in your own words, explain what this means.