Chapter 12

1. User interface ________________ include key presses, mouse moves, button clicks, and menu selections.

2. The methods of a(n) ________________ describe the actions to be taken when an event occurs.

3. A(n) ________________ is the user interface component that generates a particular event.

4. Button listeners must belong to a class that implements the ________________ interface.

5. When an event occurs, the event source notifies all ________________.

6. Insert the missing statement in the following code.

```java
import ________________
import java.awt.event.ActionListener;

/**
  An action listener that prints.
*/
public class ClickListener implements ActionListener
{
  public void actionPerformed(ActionEvent event)
  {
    System.out.println("I was clicked.");
  }
}
```

7. The statement that would construct an object called button of the JButton class and pass the button label, My first button, to the constructor is ________________.

8. The ________________ container is used to group multiple user interface components together.
9. Based on the code below, the statement that would add the panel to the frame is ____________________.

```java
JFrame frame = new JFrame();
JPanel panel = new JPanel
```

10. You often install event listeners as ____________________ classes so that they can have access to the surrounding fields, methods, and final variables.

11. Based on the code below, which of the following statements correctly constructs a text field?

```java
final int FIELD_WIDTH = 10;
A) final JTextField rateField = new JTextField(FIELD_WIDTH);
B) final TextField rateField = new TextField(FIELD_WIDTH);
C) final Textfield rateField = new Textfield(FIELD_WIDTH);
D) final JTextField rateField = new JTextField();
```

12. A(n) ____ is used to capture mouse events.
   A) action listener
   B) event listener
   C) mouse listener
   D) component listener

13. The ____ method should be called whenever you modify the shapes that the `paintComponent` method draws.
   A) draw
   B) paint
   C) redraw
   D) repaint

14. Which of the following listeners would you implement in order to be notified when the user has finished editing a text field by pressing Enter?
   A) TextListener
   B) ActionListener
   C) ButtonListener
   D) MouseListener
15. Based on the code below, which of the following statements is correct?

```java
public class ClickListener implements ActionListener
{
  public void actionPerformed(ActionEvent event)
  {
    System.out.println("I was clicked.");
  }
}

public class ButtonTester
{
  public static void main(String[] args)
  {
    JFrame frame = new JFrame();
    JButton button = new JButton("Click me!");
    frame.add(button);
    ActionListener listener = new ClickListener();
    button.addActionListener(listener);
    ...
  }
}
```

A) Class ButtonTester is an interface type.
B) A ClickListener object can register as a listener for the action events that buttons generate.
C) Class ClickListener is an interface type.
D) An event occurs when you move the mouse over the button.

16. In the code below, the `getText` method returns a(n) ____ object.

```java
class AddInterestListener implements ActionListener
{
  public void actionPerformed(ActionEvent event)
  {
    double rate = Double.parseDouble(rateField.getText());
    ...
  }
}
```

A) ActionListener
B) constant
C) Integer
D) String
17. What is the purpose of the JLabel object?
   A) To allow user input.
   B) To generate action events.
   C) To provide instruction/information to the user.
   D) To respond to events.
18. Based on the code below, which of the following statements updated the rectangle coordinate values?

```java
/**
 * This component allows the to user move a rectangle by clicking the mouse.
 */
public class RectangleComponent extends JComponent
{
    public RectangleComponent()
    {
        // The rectangle that the paint method draws
        box = new Rectangle(BOX_X, BOX_Y, BOX_WIDTH, BOX_HEIGHT);
    }

    public void paintComponent(Graphics g)
    {
        super.paintComponent(g);
        Graphics2D g2 = (Graphics2D) g;
        g2.draw(box);
    }

    /**
     * Moves the rectangle to the given location.
     * @param x the x-position of the new location
     * @param y the y-position of the new location
     */
    public void moveTo(int x, int y)
    {
        box.setLocation(x, y);
        repaint();
    }

    private Rectangle box;
    private static final int BOX_X = 100;
    private static final int BOX_Y = 100;
    private static final int BOX_WIDTH = 20;
    private static final int BOX_HEIGHT = 30;
}
```

A) repaint()
B) setLocation()
C) g2.draw()
D) super.paintComponent()
19. Which of the following is the missing statement in the code below?

```java
final RectangleComponent component = new RectangleComponent();

MouseListener listener = new MousePressListener();
component.addMouseListener(listener);

frame.add(component);

frame.setSize(FRAME_WIDTH, FRAME_HEIGHT);
frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
frame.setVisible(true);
```

A) private static final int FRAME_WIDTH = 300;
B) private static final int FRAME_HEIGHT = 400;
C) Frame frame = new Frame();
D) JFrame frame = new JFrame();

20. How many methods must be supplied by a class that implements the `MouseListener` interface?
   A) 0
   B) 1
   C) 5
   D) at most 5
1. When you throw a(n) ____________________, the current method terminates immediately.

2. All subclasses of ________________ are checked exceptions.

3. ________________ exceptions extend the class RuntimeException or Error.

4. Exceptions such as NumberFormatException, IllegalArgumentException, and NullPointerException are ________________ exceptions.

5. ________________ exceptions frequently occur when you deal with input and output.

6. ________________ exceptions are due to external circumstances that the programmer cannot prevent.

7. When you throw an exception, execution does not continue with the next statement but with the first statement in a(n) ________________.

8. It is customary to provide two constructors for an exception class: a(n) ________________ constructor and a constructor that accepts a message string describing the reason for the exception.

9. In the following code, insert the statement that will close the file.
   try
   {
       reader = new FileReader(filename);
       Scanner in = Scanner.create(reader);
       readData(in);
   }
   finally
   {
   _________________________
   }
10. The FileNotFoundException is a(n) ____________________ exception.

11. You install an exception handler with the________________________ statement.

12. FileNotFoundException is a subclass of_________________________.

13. The term ____ is an alternative term for a parameter value.
   A) catch
   B) argument
   C) try
   D) exception

14. To declare that a method should be terminated when a checked exception occurs within it, you should tag the method with a(n) ____ specifier.
   A) catch
   B) try
   C) unchecked
   D) throws

15. Which of the following statements is correct?
   A) public void read(String filename) throws IOException, ClassNotFoundException
   B) public void read(String filename) throw IOException, ClassNotFoundException
   C) public void read(String filename) throw (IOException, ClassNotFoundException)
   D) public void read(String filename) throws IOException, throws ClassNotFoundException

16. Where would you call the close method to ensure that a file would close even if an exception occurred?
   A) try block
   B) catch block
   C) finally clause
   D) All of the above

17. Once a try block is entered, the statements in a(n) ____ clause are guaranteed to be executed, whether or not an exception is thrown.
   A) catch
   B) String
   C) close
   D) finally
18. An example of a fatal error that rarely occurs and is beyond your control is the ____.
   A) FileNotFoundException
   B) RuntimeException
   C) OutOfMemoryError
   D) FileNotFoundException

19. The compiler does not check whether you handle a(n) ____.
   A) NullPointerException
   B) FileNotFoundException
   C) EOFException
   D) IllegalStateException

20. You should place ____ clauses only in methods in which you can completely handle the particular exception type.
   A) try
   B) throws
   C) checked
   D) catch
Chapter 14

1. User-interface components are arranged by placing them inside ____________________.

2. In Java, each container has its own ____________________, which determines how the components are laid out.

3. By default, a JPanel uses a(n) ____________________ layout.

4. The ____________________ layout groups containers into five areas: center, north, west, south, and east.

5. The ____________________ layout arranges components in a grid with a fixed number of rows and columns, resizing each of the components so that they all have the same size.

6. You can add a(n) ____________________ to a panel to make it visible.

7. The ____________________ method adds text to the end of a text area.

8. A(n) ____________________ is a user-interface component with two states: checked and unchecked.

9. ____________________ are round and have a black dot when selected.

10. When using a combo box, the ____________________ displays the name of the current selection.

11. Insert the missing code in the following segment.

```java
JComboBox facenameCombo = new JComboBox();
facenameCombo.addItem("Serif");
String selectedString = ____________________ facenameCombo.getSelectedItem();
```
12. The statement that adds a scroll bar to the following text area is 
____________________.

`JTextArea textArea = new JTextArea(ROWS, COLUMNS);`

13. Which of the following adds a border to the following panel?

`JPanel panel = new JPanel();`
A) `panel.addEtchedBorder();`
B) `panel.setBorder(new EtchedBorder());`
C) `panel.add(new EtchedBorder());`
D) `panel.setBorder(new EtchedBorder());`

14. Based on the statement below, which of the following codes adds a title to the border?

`JPanel panel = new JPanel();`
A) `panel.setBorder(new TitledBorder());`
B) `panel.setBorder(new TitledBorder(new EtchedBorder(), "Size"));`
C) `panel.setBorder(new TitledBorder(new EtchedBorder()));`
D) `panel.setTitle("Size");`

15. If you want to use a text field or text area for display purposes only, you should call the 
_____ method.
A) setEditable
B) addItem
C) setBorder
D) setVisible

16. Radio buttons, check boxes, and combo boxes generate a(n) _____ whenever the user 
selects an item.
A) frame
B) scroll bar
C) component
D) ActionEvent
17. Which of the following statements is correct?
A) `new JSlider()` creates a horizontal slider with the range 0 to 200 and an initial value of 100.
B) `new JSlider()` creates a horizontal slider with the range 0 to 10 and an initial value of 5.
C) `new JSlider()` creates a horizontal slider with the range 0 to 100 and an initial value of 50.
D) `new JSlider()` creates a horizontal slider with the range 0 to 150 and an initial value of 100.

18. The documentation for the JSlider class lists about ____ inherited methods.
A) less than 5
B) about 25
C) about 250
D) over 2500

19. If you want to have a tabular arrangement of components, in which columns have different sizes or one component spans multiple columns, a(n) ____ would be appropriate.
A) grid bag layout
B) grid layout
C) flow layout
D) border layout

20. A(n) ____ is a combination of a list and a textfield.
A) radio button
B) combo box
C) check box
D) scroll bar
1. If you store information in text form, as a sequence of characters, you need to use the ___________ and ___________ classes and their subclasses to process input and output.

2. The Reader class has a method, ___________, to read a single character at a time.

3. To read text data from a disk file, you should create a(n) __________ object.

4. To read binary data from a disk file, you should create a(n) __________ object.

5. The __________ method returns an integer, either -1, at the end of the file, or another value, which you need to cast to a char or byte.

6. In __________ file access, the file is processed one byte at a time.

7. Which of the following statements enables you to write output to a file?
   A) PrintWriter out = new PrintWriter();
   B) PrintWriter out = new PrintWriter("output.txt");
   C) FileReader reader = new FileReader("input.txt");
   D) Scanner in = new Scanner(reader);

8. In Java, the simplest mechanism for reading text is to use the ____ class.
   A) ReadWrite
   B) Scanner
   C) PrintWriter
   D) Serializable

9. Readers and writers access sequences of ____.
   A) bytes
   B) characters
   C) files
   D) streams
10. Streams access sequences of ____.
   A) characters
   B) files
   C) strings
   D) bytes

11. If you store information in binary form, as a sequence of bytes, you will use the ____
    class(es) and their subclasses.
   A) InputStream and OutputStream
   B) Serializable
   C) PrintWriter
   D) Reader and Writer
1. Occasionally, a class has no objects but contains a collection of related static methods and constants. Such a class is called a(n) ____________________ class.

2. ____________________ is a notation for object-oriented analysis and design invented by Grady Booch, Ivar Jacobson, and James Rumbaugh.

3. In Java, a method can never change parameters of ____________________ type.

4. A class depends on another class if it uses ____________________ of that class.

5. A(n) ____________________ should represent a single concept from the problem domain, such as business, science, or mathematics.

6. A(n) ____________________ method modifies the object on which it is invoked.

7. A(n) ____________________ class has no mutator methods.

8. If a method modifies another object, the modification is referred to as a(n) ____________________.

9. A(n) ____________________ is a requirement that the caller of a method must meet.

10. To execute a program with assertion checking turned on, use the command: java ____________________ MyProg

11. A(n) ____________________ method is not invoked on an object.

12. A(n) ____ field belongs to the class, not to any object of the class.
   A) static
   B) instance
   C) private
   D) public
13. The ____ of a variable is the region of a program in which the variable can be accessed.
   A) class
   B) location
   C) scope
   D) path

14. A(n) ____ is prefixed by its class name or by an object reference, such as Math.sqrt or other.balance.
   A) static field
   B) unqualified instance
   C) overlapping scope
   D) qualified name

15. Which of the following code fragments is considered questionable style?
   A) public void deposit(double amount)
      {
        double newBalance = balance + amount;
        balance = newBalance;
      }
   B) public void transfer(double amount, BankAccount other)
      {
        balance = balance - amount;
        other.balance = other.balance + amount;
      }
   C) public void deposit(double amount)
      {
        amount = balance + amount;
        balance = amount;
      }
   D) String name = "John Q. Public";
      String uppercased = name.toUpperCase();

16. A(n) ____ is a set of related classes.
    A) object
    B) package
    C) variable scope
    D) constructor

17. The String class is an example of a(n) ____ class.
    A) immutable
    B) mutator class
    C) accessor class
    D) primitive class
18. Which of the following statements is correct?
   A) A qualified instance field or method name refers to the this parameter.
   B) It is possible to have local variables with identical names if their scopes overlap.
   C) Public members of a class have class scope.
   D) Every method of a class can access its static fields.

19. Which of the following statements is correct?
   A) Objects are collections of classes.
   B) It is good practice to minimize the coupling between classes.
   C) Almost all classes operate autonomously. That is, they do not need other classes to do their jobs.
   D) When designing programs, a rule of thumb is to turn actions into classes.

20. Which of the following classifications of method behavior is correct?
   A) Accessor methods with no changes to any explicit parameters always have side effects.
   B) Mutator methods with no changes to any explicit parameters do not have side effects.
   C) Methods that change an explicit parameter always have side effects.
   D) Methods that change another object do not have side effects.
1. ___________ is a mechanism for extending existing classes by adding methods and fields.

2. The more generalized class that forms the basis for inheritance is called the ___________.

3. In Java, every class that does not specifically extend another class is a subclass of the class ________________.

4. When the keyword ________________ is followed by a parenthesis, it indicates a call to the superclass constructor.

5. A(n) ________________ has no access to the private fields of its superclass.

6. Use the ________________ keyword to call a method of the superclass.

7. The ________________ operator tests whether an object belongs to a particular type.

8. The ability to refer to objects of multiple types with varying behavior is called ________________.

9. With a few exceptions, instance and static fields of classes should always have ________________ access.

10. Classes that are used for implementation reasons should have ________________ access.

11. In Java, every class that is defined without an explicit extends clause automatically extends the class ____.
    A) Boolean
    B) Integer
    C) Object
    D) String
12. Which of the following statements is correct?
   A) You cannot inherit methods from the superclass.
   B) Subclass references cannot be converted to superclass references.
   C) Very few references can be converted to the type Object.
   D) You can override methods from the superclass.

13. Which of the following statements is correct?
   A) The toString() method tests whether or not an object is a string.
   B) If you define a method that did not exist in the superclass, then the new method can
      be applied only to subclass objects.
   C) Package access is recommended for fields in most cases.
   D) Instance fields can be overridden.

14. Java has ____ levels of controlling access to fields, methods, and classes.
   A) one
   B) two
   C) three
   D) four

15. The ____ is called whenever you want to compare whether two objects have the same
    contents.
   A) equalsTo method
   B) equals method
   C) == operator
   D) isEquals method

16. The ____ method makes a new object with the same state as an existing object.
   A) clone
   B) copy
   C) duplicate
   D) newCopy

17. The dual use of the super keyword is analogous to the dual use of the ____ keyword.
   A) final
   B) instanceof
   C) this
   D) abstract
18. Which of the following statements assigns "Harry's age is 18" to s?
   A)  int age = 18;
       String s = "Harry's age is " + age;
   B)  int age = 18;
       String s == "Harry's age is " + age;
   C)  int age = 18;
       String s = 'Harry's age is ' + 18;
   D)  int age = 18;
       String s == "Harry's age is " + 18;

19. Which of the following tests whether two references are the same object?
   A)  equals
   B)  instanceof
   C)  ==
   D)  =

20. In Java, every class that is defined without an explicit extends clause automatically extends the class ____.
   A)  java
   B)  immutable
   C)  clone
   D)  Object
Chapter 11

1. __________________ types are often used to make code more general and more reusable by focusing on the essential operations that are carried out.

2. All methods in an interface are __________________; that is, they have a name, parameters, and a return type, but they do not have an implementation.

3. A class implements an interface type if it declares the interface in a(n) __________________ clause, and if it implements the method or methods that the interface requires.

4. You need a(n) __________________ to convert from an interface type to a class type.

5. __________________ denotes the principle that behavior can vary depending on the actual type of an object.

6. __________________ binding of methods occurs if the compiler selects a method from several possible candidates.

7. A(n) __________________ is any class that is defined inside another class.

8. The __________________ class in the javax.swing package generates a sequence of events, spaced apart at even time intervals.

9. A(n) __________________ is notified when a particular event occurs.

10. When you use a timer, you need to define a class that implements the __________________ interface.

11. A(n) __________________ is a statement group enclosed by braces.
12. Which of the following statements is correct?
   A) Methods of an inner class can access variables from the surrounding scope.
   B) If an interface variable refers to an object, then the object need not belong to a class.
   C) It is illegal to have variables whose type is an interface.
   D) Methods of an inner class cannot access variables from the surrounding scope.

13. An interface type does not have ____.
   A) return types
   B) instance fields
   C) abstract methods
   D) public methods

14. Which of the following statements is correct?
   A) Interfaces are classes.
   B) A class can implement more than one interface type.
   C) All fields in an interface are private.
   D) A class can implement only one interface type.

15. A Java ____ declares a set of methods and their signatures.
   A) local variable
   B) object
   C) interface type
   D) event

16. ____ can reduce the coupling between classes.
   A) Methods
   B) UML
   C) Interfaces
   D) Objects
17. Based on the code below, which of the following statements is correct?

```java
public interface Measurable {
    double getMeasure();
}

public class Coin implements Measurable {
    public double getMeasure() {
        return value;
    }
}

class DataSet {
    ...
    public void add() {
    ...
}

class BankAccount {
    ...
    public void add() {
    ...
}
}

A) Coin dime = new Coin(0.1, "dime");
   Measurable x = dime;
B) Coin dime = new Coin(0.1, "dime");
   Dataset x = dime;
C) Coin dime = new Coin(0.1, "dime");
   DataSet x == dime;
D) Coin dime = new Coin(0.1, "dime");
   BankAccount x = dime;
```
18. ____ occurs when a single class has several methods with the same name but different parameter types.
   A) Casting
   B) Polymorphism
   C) Overloading
   D) Instantiation

19. Which of the following statements will compile without error?
   A) `public interface ActionListener()
      {
      void actionPerformed(ActionEvent event);
      }
   B) `public interface ActionListener()
      {
      void actionPerformed(ActionEvent);
      }
   C) `public interface ActionListener
      {
      void actionPerformed(ActionEvent event);
      }
   D) `public abstract ActionListener()
      {
      void ActionPerformed(ActionEvent event);
      }

20. The following code is an example of a(n) ____.

    ```java
    public static int min(int a, int b, int c)
    {
    ...
    }

    public static int min(int a, int b, int c, int d)
    {
    ...
    }
    ```

   A) polymorphism
   B) overloaded method
   C) casting
   D) instantiation