Student Name: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ Student ID # ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

OU Academic Integrity Pledge
On my honor I affirm that I have neither given nor received inappropriate aid in the completion of this exercise.

Signature: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ Date: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

Notes Regarding this Examination

Open Book(s) You may consult any printed textbooks in your immediate possession during the course of this examination.

Open Notes You may consult any printed notes in your immediate possession during the course of this examination.

No Electronic Devices Permitted You may not use any electronic devices during the course of this examination, including but not limited to calculators, computers, and cellular phones. All electronic devices in the student's possession must be turned off and placed out of sight (for example, in the student's own pocket or backpack) for the duration of the examination.

Violations Copying another's work, or possession of electronic computing or communication devices in the testing area, is cheating and grounds for penalties in accordance with school policies.

Part I. Java Graphics

1. (2 points) The main purpose of a layout manager is to do which of the following?
   - A. To hold a set of graphical objects
   - B. To provide a window for a graphical user interface
   - C. To provide a standard building block for graphical user interfaces
   - **D. To keep a graphical object's contents organized when the graphical object is re-sized**
   - E. None of the above

2. (2 points) The main purpose of a `JPanel` is to do which of the following?
   - **A. To hold a set of graphical objects**
   - B. To provide a window for a graphical user interface
   - C. To provide a standard building block for graphical user interfaces
   - D. To keep a graphical object's contents organized when the graphical object is re-sized
   - E. None of the above

3. (2 points) The main purpose of a `JFrame` is to do which of the following?
   - A. To hold a set of graphical objects
   - **B. To provide a window for a graphical user interface**
   - C. To provide a standard building block for graphical user interfaces
   - D. To keep a graphical object's contents organized when the graphical object is re-sized
   - E. None of the above

4. (2 points) The main purpose of a container is to do which of the following?
   - **A. To hold a set of graphical objects**
   - B. To provide a window for a graphical user interface
   - C. To provide a standard building block for graphical user interfaces
   - D. To keep a graphical object's contents organized when the graphical object is re-sized
   - E. None of the above

5. (2 points) The main purpose of a component is to do which of the following?
   - A. To hold a set of graphical objects
   - B. To provide a window for a graphical user interface
   - **C. To provide a standard building block for graphical user interfaces**
   - D. To keep a graphical object's contents organized when the graphical object is re-sized
   - E. None of the above

6. (2 points) A modal window is which of the following?
   - A. A window in which model data is displayed
   - B. A class that adapts window contents as the window re-sizes
   - C. An abstract class with concrete methods that have empty bodies
   - D. Any window that is part of the model, view, controller design pattern
   - **E. A secondary window that must be addressed before control returns to a corresponding primary window**

7. (2 points) `WindowAdapter` is which of the following?
   - A. A window in which model data is displayed
   - B. A class that adapts window contents as the window re-sizes
   - **C. An abstract class with concrete methods that have empty bodies**
   - D. Any window that is part of the model, view, controller design pattern
   - E. A secondary window that must be addressed before control returns to a corresponding primary window

8. (2 points) One advantage of a heavy weight component over a light weight component is which of the following?
   - A. A heavy weight component can contain light weight components
   - **B. A heavy weight component can serve as a top level window in an application**
   - C. A heavy weight component requires fewer resources than a light weight component
   - D. All of the above
   - E. None of the above

9. (2 points) One advantage of a light weight component over a heavy weight component is which of the following?
   - A. A heavy weight component can contain light weight components
   - B. A heavy weight component can serve as a top level window in an application
   - C. A heavy weight component requires fewer resources than a light weight component
   - D. All of the above
   - **E. None of the above**

10. (2 points) A `JFrame` is which of the following?
    - A. A `Window`
    - B. A `Container`
    - C. A `Component`
    - **D. All of the above**
    - E. None of the above

11. (2 points) Customizing the rendering of a `JComponent` subclass can be accomplished by doing which of the following?
    - A. Calling `paintComponent()`
    - B. Extending `paintComponent()`
    - **C. Overriding `paintComponent()`**
    - D. Overloading `paintComponent()`
    - E. Encapsulating `paintComponent()`

12. (2 points) Which method should generally be called last?
    - **A. `setVisible(true)`**
    - B. `setBackground(color)`
    - C. `setSize(width, height)`
    - D. `setLayout(layoutManager)`
    - E. `setLocationRelativeTo(component)`

13. (2 points) Which is an advantage of `BorderLayout` over `FlowLayout`?

   A. `FlowLayout` only works with `JComponent`s
   B. `BorderLayout` keeps all components the same size
   C. Borders can be added more easily using `BorderLayout`
   D. `FlowLayout` requires position constants for components
   E. `BorderLayout` *retains the relative position of its components*

Part II. Event Driven Programming

14. (2 points) Which type of entity notifies other entities when an action occurs?

   A. *A source*
   B. An event
   C. A listener
   D. A component
   E. None of the above

15. (2 points) Which type of entity is notified by other entities when an action occurs?

   A. A source
   B. An event
   C. *A listener*
   D. A component
   E. None of the above

16. (2 points) Which type of entity is created when an action occurs?

   A. A source
   B. *An event*
   C. A listener
   D. A component
   E. None of the above

17. (2 points) The relationship between event sources and event listeners can be which of the following?

   A. One to one
   B. Many to one
   C. One to many
   D. Many to many
   E. *All of the above*

18. (2 points) Which of the following is an event source?

   A. `javax.swing.JList`
   B. `javax.swing.Timer`
   C. `javax.swing.JFrame`
   D. `javax.swing.JButton`
   E. *All of the above*

19. (2 points) The relationship between an event source and an event listener is which of the following?
    - A. Inheritance
    - **B. Aggregation**
    - C. Composition
    - D. Encapsulation
    - E. Dynamic Binding

20. (2 points) `ActionListener` is which of the following?
    - A. A class to be used by a source class
    - B. A method to be called by a source method
    - C. An object to be notified by a source object
    - **D. An interface to be implemented by a listener class**
    - E. An abstract class to be subclassed by a listener class

Part III. Model, View, Controller

For this exam, all MVC questions refer to the particular version of MVC we have been studying.

21. (2 points) MVC is which of the following?
    - A. Another name for `Java.awt`
    - B. The three main classes found in graphical user interfaces
    - **C. A set of design patterns for organizing GUI-based programs**
    - D. All of the above
    - E. None of the above

22. (2 points) A model needs to listen for which types of events?
    - A. State update notifications
    - B. GUI gestures
    - C. State queries
    - D. State changes
    - **E. None of the above**

23. (2 points) A view needs to listen for which types of events?
    - **A. State update notifications**
    - B. GUI gestures
    - C. State queries
    - D. State changes
    - E. None of the above

24. (2 points) A controller needs to listen for which types of events?
    A. State update notifications
    B. GUI gestures
    C. State queries
    D. State changes
    E. None of the above

25. (2 points) A model needs to create and send which types of events?
    A. State update notifications
    B. GUI gestures
    C. State queries
    D. State changes
    E. None of the above

26. (2 points) A view needs to create and send which types of events?
    A. State update notifications
    B. GUI gestures
    C. State queries
    D. State changes
    E. None of the above

27. (2 points) A controller needs to create and send which types of events?
    A. State update notifications
    B. GUI gestures
    C. State queries
    D. State changes
    E. None of the above

28. (2 points) A main purpose of models is to do which of the following?
    A. Graphically display application data to the user
    B. Store and provide controlled access to application data
    C. Create the primary parts of the system and link them together
    D. Provide the logic that determines how user interactions relate to program behavior
    E. None of the above

29. (2 points) A main purpose of views is to do which of the following?
    A. Graphically display application data to the user
    B. Store and provide controlled access to application data
    C. Create the primary parts of the system and link them together
    D. Provide the logic that determines how user interactions relate to program behavior
    E. None of the above

30. (2 points) A main purpose of controllers is to do which of the following?
     - A. Graphically display application data to the user
     - B. Store and provide controlled access to application data
     - C. Create the primary parts of the system and link them together
     - **D. Provide the logic that determines how user interactions relate to program behavior**
     - E. None of the above

31. (2 points) A main purpose of drivers is to do which of the following?
     - A. Graphically display application data to the user
     - B. Store and provide controlled access to application data
     - **C. Create the primary parts of the system and link them together**
     - D. Provide the logic that determines how user interactions relate to program behavior
     - E. None of the above

32. (2 points) A model typically has reference(s) to which of the following?
     - A. The view(s)
     - **B. The listener(s) in the view(s)**
     - C. The controller(s)
     - D. The listener(s) in the controller(s)
     - E. A and B

33. (2 points) A controller typically has reference(s) to which of the following?
     - A. The view(s)
     - B. The listener(s) in the view(s)
     - C. The model(s)
     - D. The listener(s) in the model(s)
     - **E. A and C**

34. (2 points) A view typically has reference(s) to which of the following?
     - A. The model(s)
     - B. The listener(s) in the model(s)
     - C. The controller(s)
     - D. The listener(s) in the controller(s)
     - **E. A and D**

35. (2 points) To convert a non-MVC class for application data into an MVC model class, you should modify which methods?
     - A. Accessors
     - **B. Mutators**
     - C. Constructors
     - D. All of the above
     - E. None of the above

36. (2 points) To convert a non-MVC class for application data into an MVC model class, you should add which methods?

      A. `processEvent()`

      B. `addActionListener()`

      C. `removeActionListener()`

      D. All of the above

      E. None of the above

37. (2 points) Where are you likely to find calls to `getSource()`?

      A. In the model

      B. In the view

      C. In the controller

      D. A and B

      E. B and C

38. (2 points) Where are you likely to find calls to `actionPerformed()`?

      A. In the model

      B. In the view

      C. In the controller

      D. A and B

      E. B and C

Part IV. Exceptions

39. (2 points) An exception is which of the following?

      A. An example that proves a rule true

      B. An example that proves a rule false

      C. The `else` branch of an `if`–`then` statement

      D. A problem that a program is unable to handle

      E. A problem that a program should try to handle

40. (2 points) Multiple `catch` blocks for the same `try` block should be placed in which order?

      A. Most specific to most general

      B. Most general to most specific

      C. Most important to least important

      D. Least important to most important

      E. Trick question; each `try` block will have only one `catch` block

41. (2 points) When an exception is thrown to your method, your method cannot do which of the following?

      A. Catch the exception and handle it

      B. Re-throw the exception to a special exception handling method

      C. Catch the exception, check its type, then handle it or re-throw it

      D. Re-throw the exception to the method from which your method was called

      E. Catch the exception, handle it, then create and throw a different exception

42. (2 points) Which is a good reason for a method to re-throw an exception that was thrown to it?
    A. Because the exception may be an `IOException`
    B. Because the exception may be a subclass of `Throwable`
    C. Because the exception may be a subclass of the method
    D. *Because the method to which the exception is re-thrown may have a broader context*
    E. Because the method to which the exception was first thrown may be the `main` method

43. (2 points) Which is a good reason for your method to create a new exception and throw it?
    A. Because your method inadvertently divides by zero
    B. Because the file your method tries to access isn't found
    C. *Because your method is called with an inappropriate argument*
    D. Because your method accidentally tries to index beyond the end of an array
    E. All of the above

44. (2 points) The relationship between an `IOException` and a `FileNotFound` exception is which of the following?
    A. *Inheritance*
    B. Aggregation
    C. Composition
    D. Encapsulation
    E. Dynamic Binding

45. (2 points) What is a purpose of the `throws` (note the 's') keyword?
    A. To delineate code that should run whether or not an exception is thrown
    B. To denote the location at which code should send an exception to the method's caller
    C. *To force programmers to explicitly acknowledge that their code might throw exceptions*
    D. To delineate which code to run when a particular type of exception is thrown to this method
    E. To delineate code in which an exception might be generated so that it can be matched with code to handle that exception

46. (2 points) What is a purpose of the `throw` (note the lack of 's') keyword?
    A. To delineate code that should run whether or not an exception is thrown
    B. *To denote the location at which code should send an exception to the method's caller*
    C. To force programmers to explicitly acknowledge that their code might throw exceptions
    D. To delineate which code to run when a particular type of exception is thrown to this method
    E. To delineate code in which an exception might be generated so that it can be matched with code to handle that exception

47. (2 points) What is a purpose of `catch` blocks?
    - A. To delineate code that should run whether or not an exception is thrown
    - B. To denote the location at which code should send an exception to the method's caller
    - C. To force programmers to explicitly acknowledge that their code might throw exceptions
    - **D. To delineate which code to run when a particular type of exception is thrown to this method**
    - E. To delineate code in which an exception might be generated so that it can be matched with code to handle that exception

48. (2 points) What is a purpose of `try` blocks?
    - A. To delineate code that should run whether or not an exception is thrown
    - B. To denote the location at which code should send an exception to the method's caller
    - C. To force programmers to explicitly acknowledge that their code might throw exceptions
    - D. To delineate which code to run when a particular type of exception is thrown to this method
    - **E. To delineate code in which an exception might be generated so that it can be matched with code to handle that exception**

49. (2 points) What is the purpose of `finally` blocks?
    - **A. To delineate code that should run whether or not an exception is thrown**
    - B. To denote the location at which code should send an exception to the method's caller
    - C. To force programmers to explicitly acknowledge that their code might throw exceptions
    - D. To delineate which code to run when a particular type of exception is thrown to this method
    - E. To delineate code in which an exception might be generated so that it can be matched with code to handle that exception

50. (2 points) A method that declares that it `throws` a general exception type may actually `throw` a more specific exception. This is an example of which?
    - A. Generics
    - B. Overriding
    - C. Overloading
    - **D. Subclass assignment**
    - E. Dynamic method binding