

Java Programming II Lab4

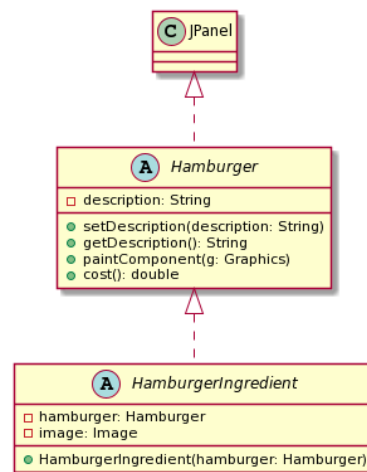
514770-1
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Lab4

- Practice to write a program that decorate hamburger with various ingredients using **Decorator pattern**.
 - The abstract class Hamburger extends JPanel and has the abstract method double cost().
 - The abstract class HamburgerIngredient (**decorator**) extends Hamburger and has the abstract method String getDescription().
 - BeefPatty, ChickenPatty, ShrimpPatty (extends HamburgerIngredient) decorate with its own patty image.
 - CheeseTopping, LettucusTopping, OnionTopping, TomatoTopping (extends HamburgerIngredient) decorate with its own topping image.
 - EmptyBurger (extends Hamburger) draw nothing.
 - BottomBun (extends Hamburger) draw BottomBun.
 - TopBun (extends HamburgerIngredient) decorate with TopBun.

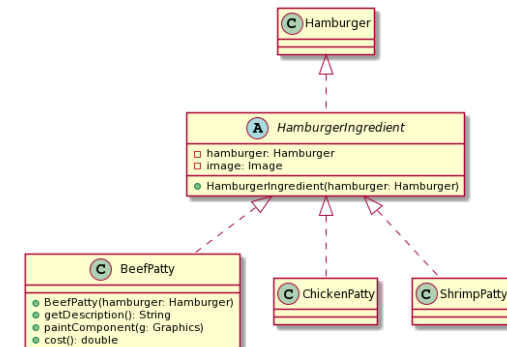
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- **Hamburger** extends **JPanel**. It has **description** member field and the abstract method **double cost()**.
- Hamburger paintComponent() draws.
- **HamburgerIngredient** extends **Hamburger**. It has **image** member field and the abstract method String getDescription().



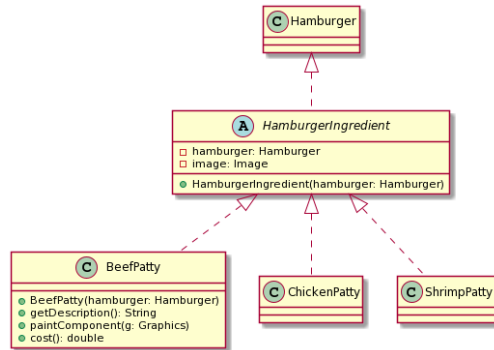
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- **BeefPatty, ChickenPatty, ShrimpPatty** set its description and draw its own image.
 - Constructor **set its image**.
 - cost() **returns its amount of cost**.



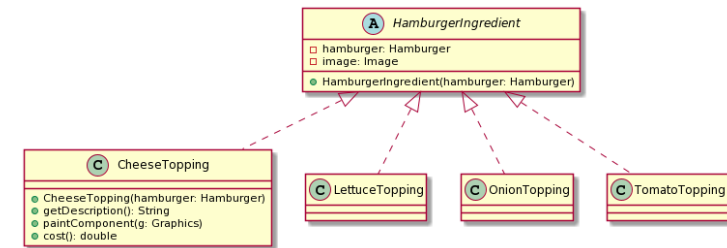
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- **BeefPatty, ChickenPatty, ShrimpPatty** set its description and draw its own image.
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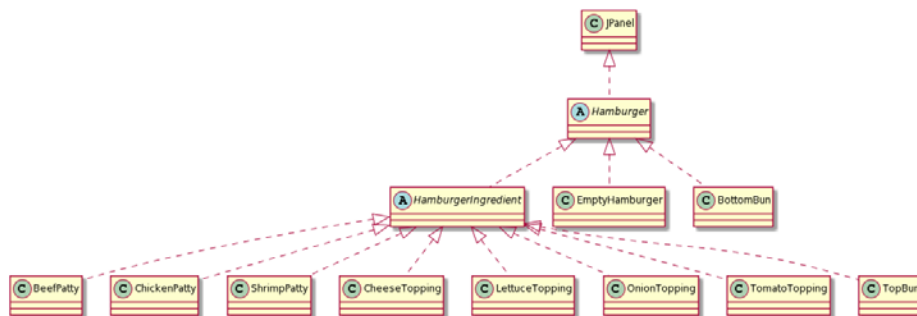
Lab4

- **CheeseTopping, LettuceTopping, OnionTopping, TomatoTopping** set its description and draw its own image.
 - Constructor **set its image.**
 - cost() **returns its amount of cost.**



Lab4

- Class Diagram



Lab4

- MainFrame class has 9 buttons.

```

public class MainFrame extends JFrame implements ActionListener {
    JButton[] buttons = new JButton[9]; // button
    Hamburger hamburger = new EmptyHamburger(); // default
    ...
    JPanel displayPanel = new JPanel(new BorderLayout());
    displayPanel.add(hamburger);
    button[0] = new JButton("BeefPatty");
    button[0].addActionListener(this);
    ...
    JPanel buttonPanel = new JPanel(new GridLayout(3,1));

    public void actionPerformed(ActionEvent e) {
        ...
    }
}

```

Lab4

```
... displayPanel.remove(hamburger); // remove previous one
...if (button == button[0]) ...
    displayPanel.add(hamburger); // add new selected hamburgerIngredient
    displayPanel.revalidate();
    displayPanel.repaint();
}
}
public class BeefPatty extends HamburgerIngredient {
    @Override
    public void paintComponent(Graphics g) {
        hamburger.paintComponent(g); // decorated paintComponent
        Graphics2D g2 = (Graphics2D) g;
        if (image != null) g2.drawImage(image, 125, 150, 330, 300, this);
    }
}
```

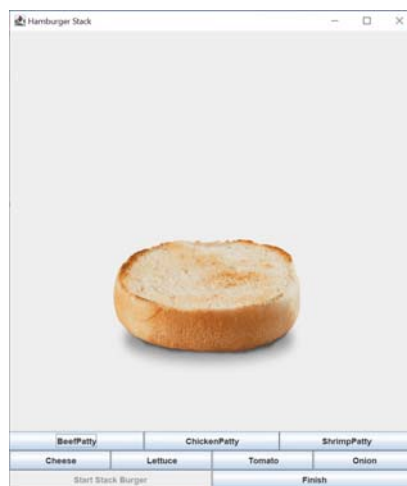
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- First, it displays "EmptyHamburger". Only "Start" button is enabled.



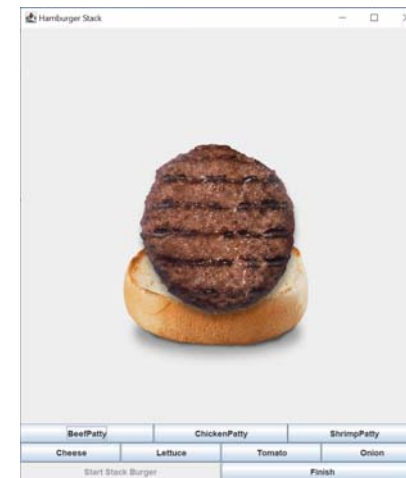
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- Then, click on "Start" button, it displays "BottomBun".



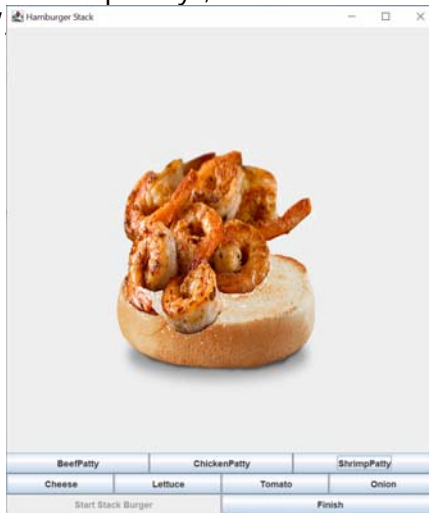
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- Then, clicking "BeefPatty", it decorates Hamburger with "BeefPatty".



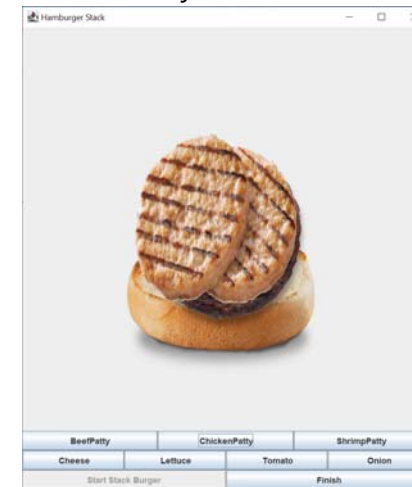
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- Then, clicking "ShrimpPatty", it decorates Hamburger with "ShrimpPatty"



Lab4

- Then, clicking "ChickenPatty", it decorates Hamburger with "ChickenPatty".



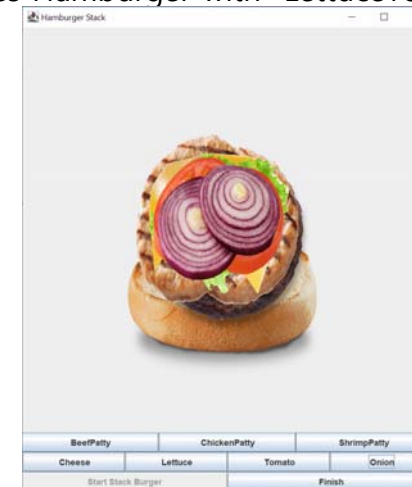
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- Then, clicking "CheeseTopping", it decorates Hamburger with "CheeseTopping".



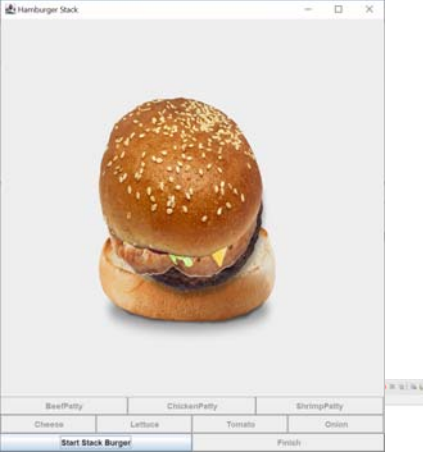
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- Then, clicking "LettuceTopping", "Tomato" & "Onion", it decorates Hamburger with "LettuceTopping", "Tomato" & "Onion".



Lab4

- Then, clicking "Finish", it decorates Hamburger with "TopBun".



The screenshot shows a Java application window titled "Hamburger Stack" displaying a hamburger. Below the hamburger is a table with columns for "BeefPatty", "ChickenPatty", and "StringPatty". Under "BeefPatty" are "Cheese" and "Lettuce". Under "ChickenPatty" are "Tomato" and "Onion". Under "StringPatty" are "Start Stack Burger" and "Finish".

```
BottomBun BeefPatty 4500.0 won
BottomBun BeefPatty ChickenPatty 9300.0 won
BottomBun BeefPatty ChickenPatty CheeseTopping 10300.0 won
BottomBun BeefPatty ChickenPatty CheeseTopping LettuceTopping 10500.0 won
BottomBun BeefPatty ChickenPatty CheeseTopping LettuceTopping TomatoTopping 11000.0 won
BottomBun BeefPatty ChickenPatty CheeseTopping LettuceTopping TomatoTopping OnionTopping 11300.0 won
BottomBun BeefPatty ChickenPatty CheeseTopping LettuceTopping TomatoTopping OnionTopping TopBun 11300.0 won
```

Submit to e-learning

- Add your code (e.g., additional method, class, routine, etc) in the Lab4 assignment.
- Submit the Lab4 assignment (JAVA21-2-Lab4-ID-name.zip including the report) to e-learning (due by 10/10).