

## **Results:**

### **Exercise 9.5:**

The person in the image is Alan Turing, arguably the most highly influential computer scientists of all time.

### **Exercise 9.6:**

The first person is Ada Lovelace, a mathematician known for her work on the Analytical Engine. The second person is Grace Hopper, a computer scientist and US navy admiral. She was one of the first programmers of the Harvard Mark I computer and invented one of the first compiler related tools.

The third person is Frances Allen, a computer scientist known for her work in optimizing compilers.

The fourth person is Barbara Liskov. She developed the Liskov Substitution Principle, is a Turing Award winner and was one of the first women to be granted a doctorate of Computer Science in the United States.

### **Exercise 9.7**

In this example polymorphism was used in every class utilizing inheritance.

Ex:

NewPanel extends JPanel

In addition to this, any line of code utilizing dot parameters uses polymorphism

Ex:

```
this.setBackground (Color.cyan);
```

Or

```
g.setFont(new_font);
```

### **Exercise 9.8**

Using a FlowLayout for the top panel allows the orange and the green buttons to both be visible. By changing the layout for the top panel to BorderLayout, only the green button is visible. This is because BorderLayout places components in one of five locations, since green button is added after orange button it is the only one that is visible. On the other hand, FlowLayout places components left to right by each other (row by row), therefore this is why orange is visible on the left and green is visible on the right (in the order that they are added to the top panel).

### **Exercise 9.10**

The purpose of Graphics2D extending Graphics is to utilize the concept of inheritance. Graphics2D inherits all of Graphics' classes and adds new more sophisticated classes. Doing this allows the perfectly functional methods of Graphics to be used in the subclass of Graphics2D. paintComponent() takes a Graphics object as a parameter and since Graphics2D extends Graphics, Graphics2D is a Graphics object just simply with increased functionality. Having to cast variables into the Graphics2D type when passing an instance of it into paintComponent() is simple and allows paintComponent to be compatible with both Graphics and Graphics2D rather than having to create a new version of paintComponent that takes the Graphics2D parameter.