48024 Applications Programming

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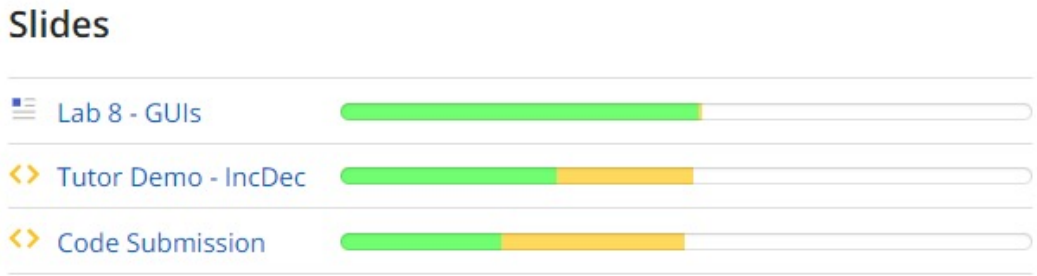
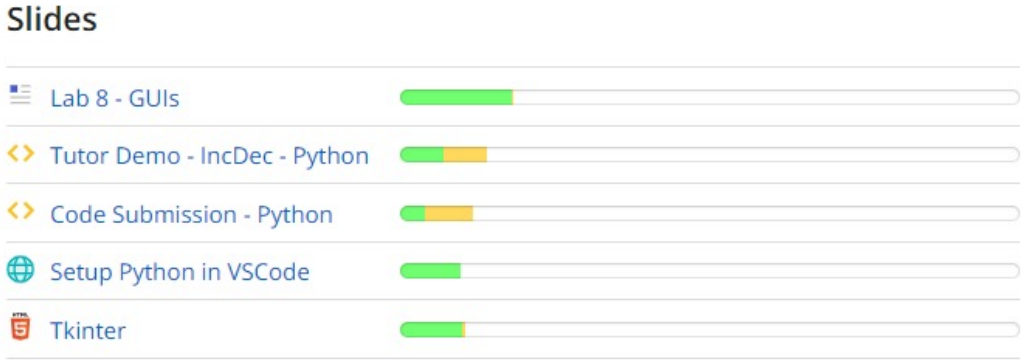
Lab8 Review

- Java



- Python



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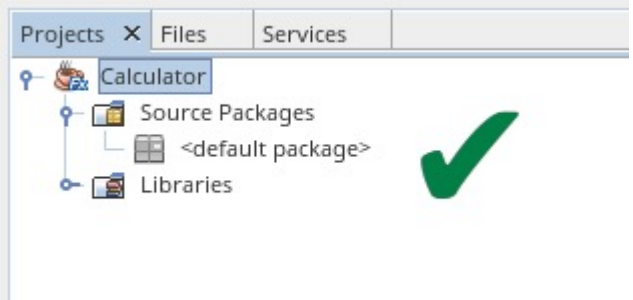
Lab8 Review

- Java--JavaFX
  - Runnable Jar file



  - PasswordField

- Python--Tkinter

```
# import tkinter module
import tkinter as tk

class LoginFormApplication(tk.Tk):
    def __init__(self):
        super().__init__()



if __name__ == '__main__':
    app = LoginFormApplication()
    app.mainloop()
```

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Key points of Study 9

- New technologies:
  - FXML
  - Properties
- Model View Controller (MVC) pattern

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MVC

The MVC pattern splits a GUI program into 3 layers

- The models are Java objects that represent the data of your application and the operations on that data.
- The views are the components that represent the graphical user interface of your application. Views “observe” data in the models.
- The controllers are the components that handle user interaction. Controllers “observe” events that occur in the views.

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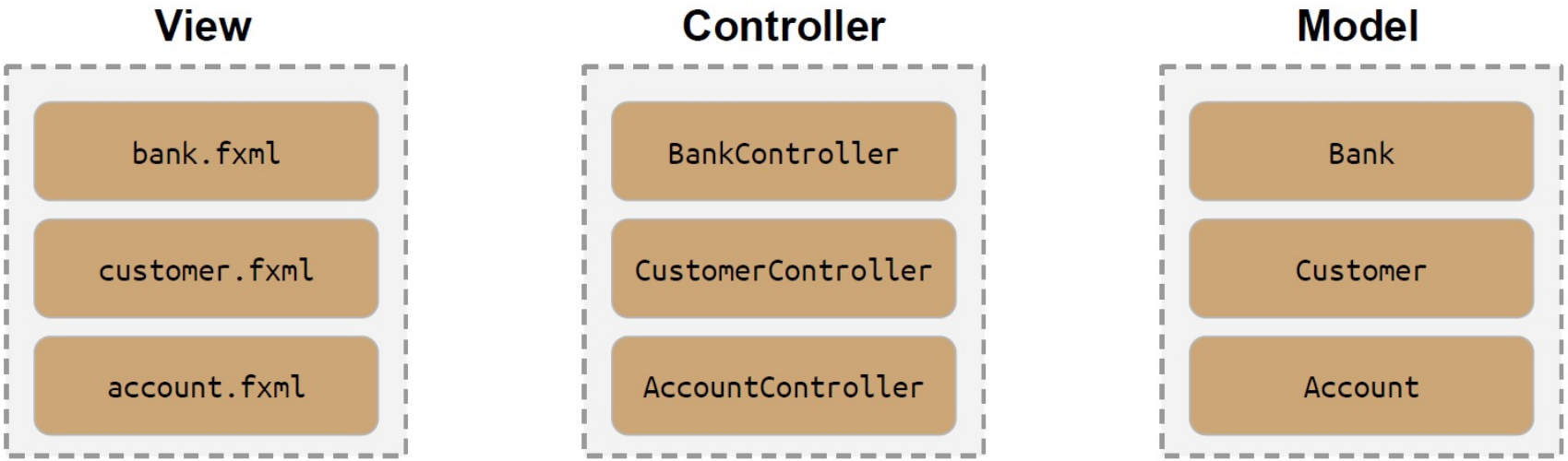
Registering as a lambda expression

```
public class MyApplication extends Application {
  private TextField usernameTf;
  private PasswordField passwordTf;

  @Override public void start(Stage stage) {
    Button loginBtn = new Button("Login");
    loginBtn.setOnAction(event -> {
        if (checkPassword(usernameTf.getText(), passwordPf.getText())
          ...
    });
    ...
  }
}
```

MVC Overview



Displays the Graphical User Interface

Handles button clicks

Stores the data

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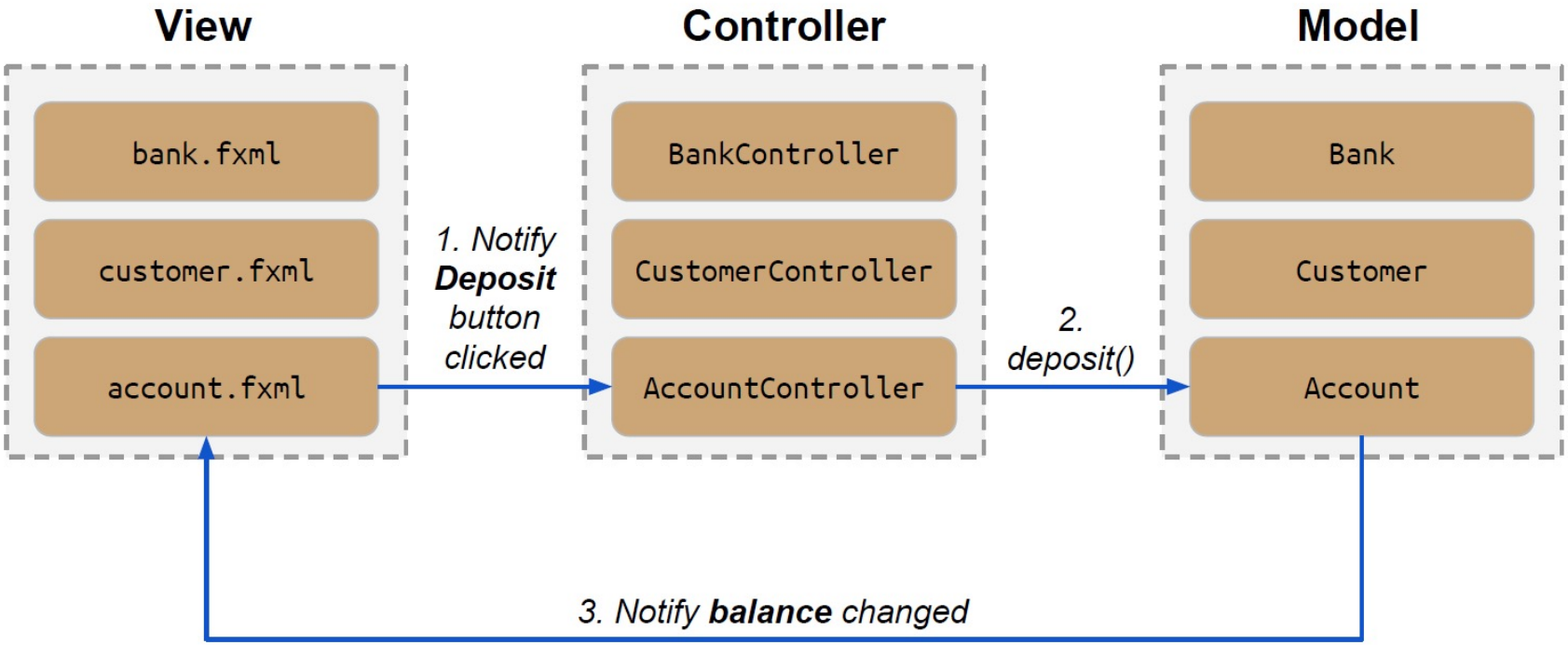
MVC Observers



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Property

- Property pattern
  - JavaBeans Property
  - Java FX Property Patterns
- Each property implements the observer pattern
- The View can be notified whenever a property changes

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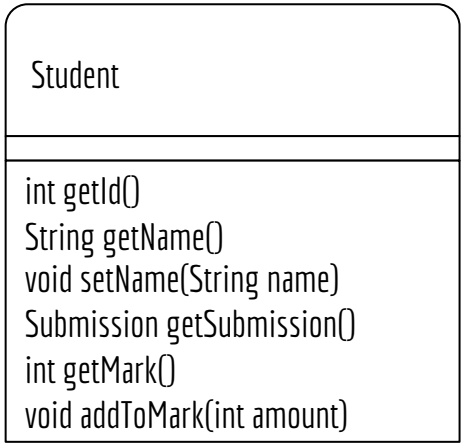
Which JavaFX property should be used...

- For “id”?
  - Immutable property
- For “name”?
  - Read Write property
- For “submission”?
  - Immutable property with mutable state
- For “mark”?
  - Read Only property



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Property bindings

- **Goal**: Property p1 is updated whenever property p2 changes.
  i.e. p1 observes p2.
  p1.bind(p2);
- **Goal**: Properties p1 and p2 are both updated whenever the other changes.
  i.e. p1 observes p2 *and* p2 observes p1
  p1.bindBidirectional(p2);

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Expression bindings in FXML

1. FXML supports unidirectional property bindings through ${...} notation.
2. FXML does not support bidirectional bindings. They must be done in Java.
3. The JavaFX expression binding language supports:
   - Dot notation for properties. e.g. controller.account.balance
   - Literals: “a string”, ‘a string’, 3.45, 27, null, true, false
   - Operators: +, -, *, /, !, &&, ||, ...

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Lab 9

- 30-40min intro/demo
- Coding - remaining time
- Topics: MVC architecture
  FXML
  properties

- The techniques practices and assessed in this lab will form the basis for Assignment 2, and so care should be taken to sufficiently prepare for it and to spend the required time to complete it.

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Lab 9 Preview

Marking Scheme

All leaf nodes are shown	10%
All nodes are laid out correctly in a grid	10%
The Sell button is correctly aligned right	5%
The product name, stock, price and cash values are shown	20%
The stock, price and cash values are formatted correctly	20%
After clicking Sell, the stock is correctly updated in the view	10%
After clicking Sell, the cash is correctly updated in the view	10%
After clicking Sell, the sell amount is reset to 0 if sell successfully	10%
Clicking Sell does nothing if there is not enough stock	5%

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Contact

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- Contact information on Canvas

See you next week!

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