CISC 3120
C12: GUI and Java FX

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Outline

- Recap
  - Project progress and lessons learned
- Graphical user interface
- Introduction to JavaFX
- Assignments

User Interface

- A system that allows two or more entities to exchange data
  - Typical entities are computers and humans
  - It includes both hardware and software

Types of User Interfaces

- Text-based user interface (or command-line interface)

- Graphical user interface

Text-based User Interface: Advantage

- Relies primarily on the keyboard and the terminal
  - Easy to customize options
  - Can do powerful tasks
  - Relatively easy to build
  - Require few resources (processor and memory) to support the interface

Text-based User Interface: Disadvantage

- Relies heavily on user's recall rather than recognition

- Navigation is often more difficult

Text-based User Interface: Your 1ˢᵗ Project

- We run the game from the command line to control window size and game level:

$ java TargetGameLauncher --window-width 80 --window-height 25 --level 2

Text-based User Interface: "javac" Example

- We use "javac" to compile Java programs

- Type "javac" on the command line

```
$ javac

Usage: javac <options> <source files>

where possible options include:

  -g                    Generate all debugging info

  -g:none               Generate no debugging info

  -g:{lines,vars,source}   Generate only some debugging info

  -nowarn               Generate no warnings

  -verbose              Output messages about what the compiler is doing

  -deprecation          Output source locations where deprecated APIs are used

  .....
```

Interfacing with "javac"

- Display version of "javac"

```
$javac -version
javac 1.8.0_131
```

- Compile a Java program targeting at Java version 8 or newer

```
$javac -target 8 HelloWorld.java
```

Text-based User Interface: "ls" Example

- We can use "ls" to list files on a Unix/Unix-like operating systems (Linux, Mac OS X, etc.)
  - ls –l: list files and directories in long format
  - ls –F: append character to indicate file types
  - ls –l –F: list files and directories in long format and append character to indicate file types
  - Common combinations of options is 100+

Interfacing with "ls"

- Common combinations of options is 100+

- Either frequently look up them from the user's manual or memorize them (recall other than recognition)

- Perhaps, we can create a program that has a menu or a list buttons

  - You need 100+ menu entries or buttons

Graphical User Interface

- Often use acronym: GUI

- Visualizes data for users graphically

- Often equipped with mouse, trackball, or touch pad

Graphical User Interface: Advantage

- Provides a friendly interface between user and program
  - Relies more on recognition than recall (less knowledge to use the application)
- Is Often equipped with point-and-click devices (mouse, trackball, joystick, touchpad …)
  - Allows user navigate easily

Graphical User Interface: Disadvantage

- Typically decreased options (less powerful)

- Typically less customizable..

  - Recall the "ls" example

  - Not easy to express many combinations of options in GUI

  - Not easy to use one set of button for many different options or combinations in GUI

Graphical User Interface

- More user friendly and easy navigation

- GUI applications are popular in modern computing

- Allows event-driven or reactive programming

- Often multi-threaded: allows multiple concurrent threads of executions

GUI Application in Java

- Discuss desktop applications
- JavaFX and Swing: focus is on JavaFX

The HelloWorldFx Application

- The application is part of Java FX tutorial from Oracle

- The source code is available via the "sampleprograms" repository on Github

Running the HelloWorldFx Program

- From the Eclipse IDE, as usual

- From the command line

  - Export a runnable Jar file

    - Project context menu → Export

  - Run the main class in the Jar file

    - One line (no line break)

    java -classpath HelloWorldFx.jar edu.cuny.brooklyn.cisc3120.HelloWorldFx.HelloWorldFx

In-Class Activity

- How do we read the HelloWorldFx program?

- In addition to the questions in the exercise sheet, think about the following:

  - Is anything familiar? (have you seen any other examples in lectures, projects, and practice assignments?)

JavaFX Applications

- Must have a main class that extends the Application class

- The entry point is actually the "start" method

  - In IDE, you need the *main(String[] args)* method

  - If packaged as a Jar file with JavaFX packager tool, the main method is not necessary

JavaFX Application Interface

- User interface

  - Stage: The JavaFX Stage class is the top-level JavaFX container.

  - Scene: The JavaFX Scene class is the container for all content.

    - The content of the scene is represented as a hierarchical scene graph of nodes.

- Mode in-depth discussion next class

Questions

- Concept of user interfaces

- Comparison of command-line and graphical user interfaces

- First GUI program in Java

Assignments

- To be available via CUNY Blackboard