Assignment 3

COMP3358 Distributed and Parallel Computing

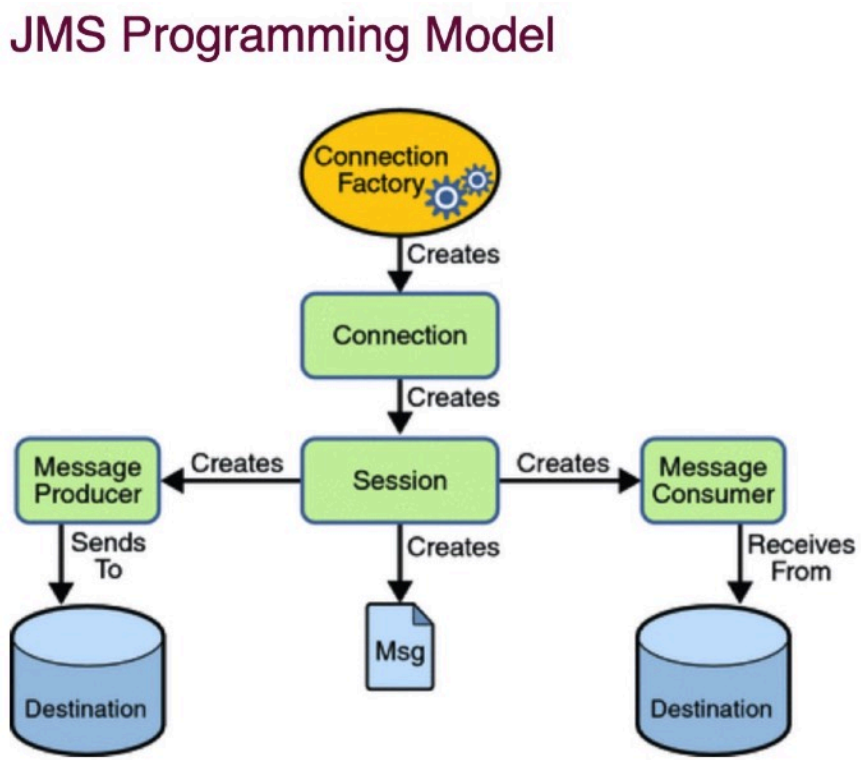
Assignment 3

- Finishing the 24 games
- Three major components
  - The game-play **GUI** (client)
  - The game-play **mechanism** (server + client)
  - **Evaluating** (and **validating**) answer

- You must use **JMS** to support the game-play mechanism

JMS setup

- JMS provider: **GlassFish 5**
  - https://javaee.github.io/glassfish/download (Download Full Platform)
- Connection factory: **jms/JPoker24GameConnectionFactory**
- Destination: **jms/JPoker24GameQueue**, **jms/JPoker24GameTopic**



JMS Demo

- You can download a pair of demo program from Moodle
  - **QueueSenderExample.java**: Sending message to JMS queue
  - **QueueReceiverExample.java**: Receive message from JMS queue

- You need to setup **GlassFish** for the program to be executed
  - See the following slides

Starting GlassFish server

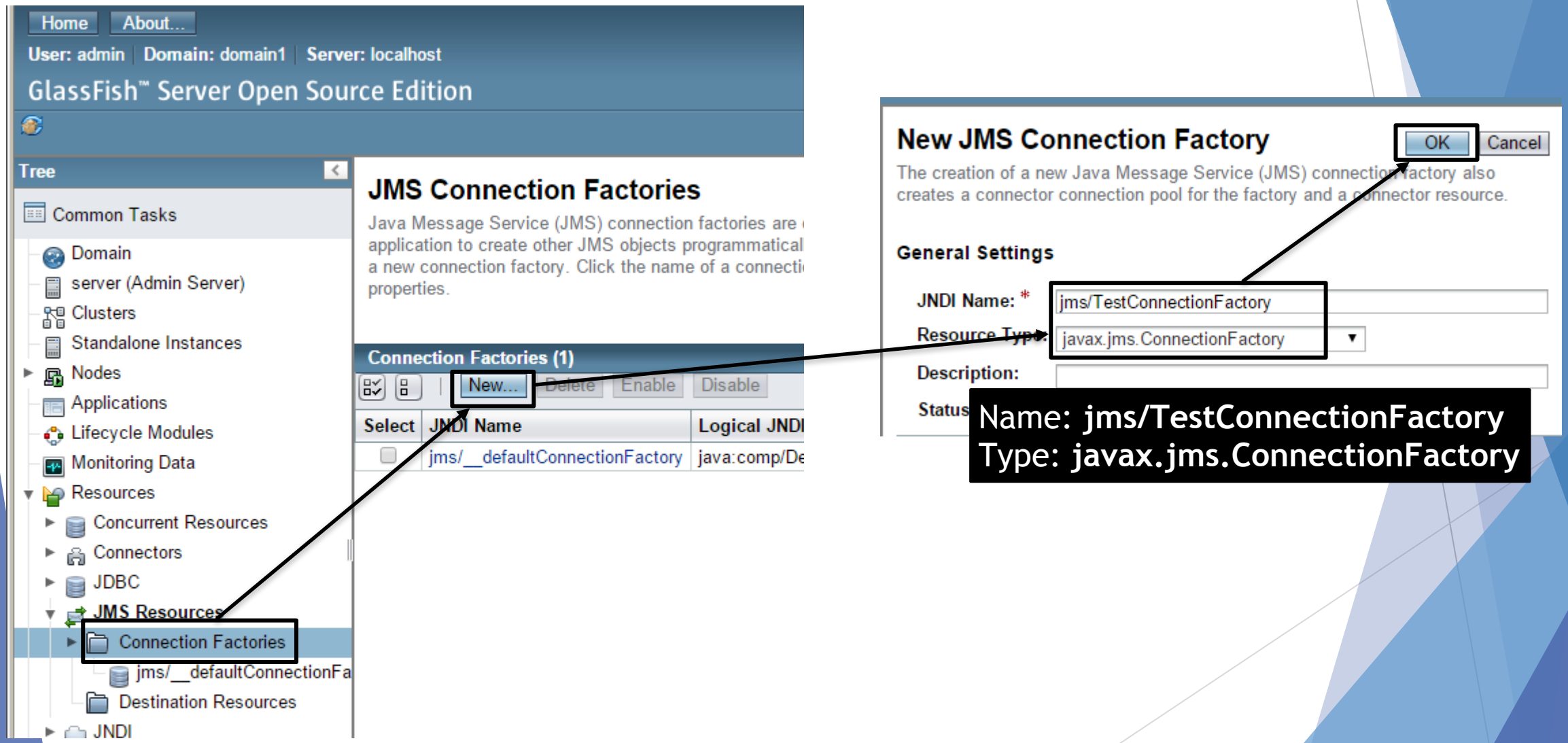
- Server can be started using command line
- Command-line utilities: **`asadmin`**
  - In a command console, execute "**`asadmin start-domain`**" to start a domain

Admin console will be accessible after a **domain** is started

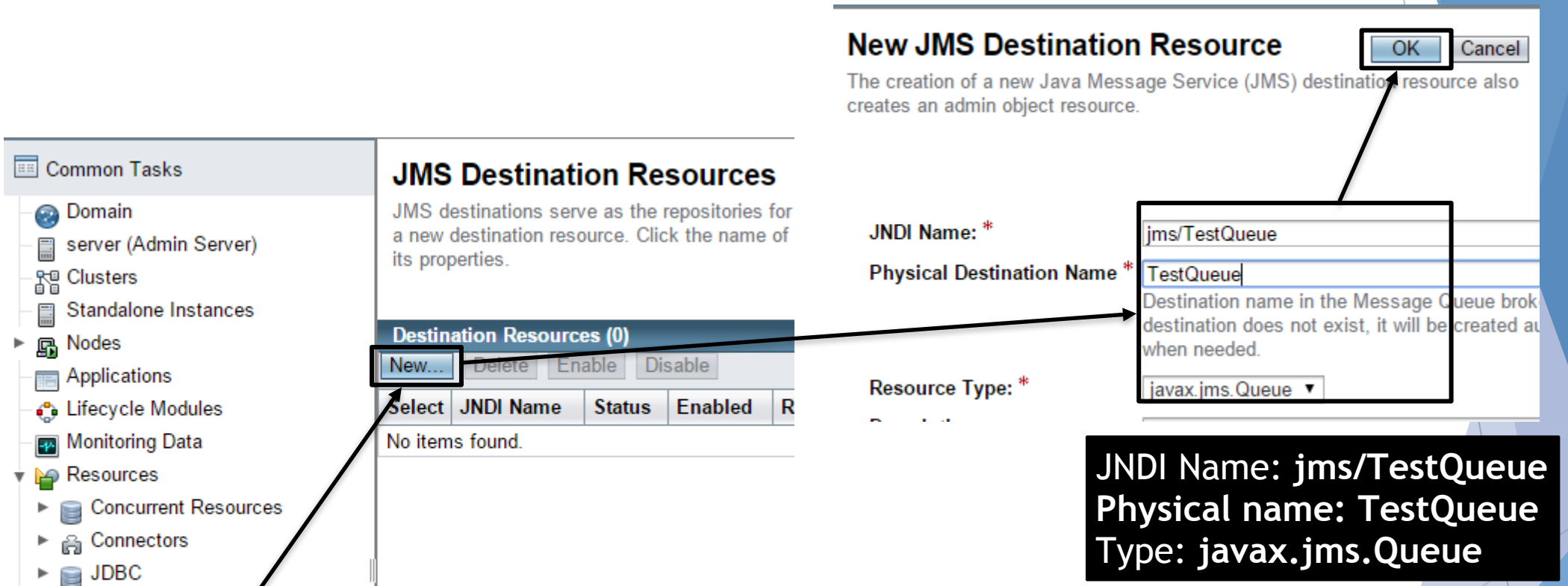
Admin console: http://localhost:4848

Connection Factory

Admin console: http://localhost:4848



Destination



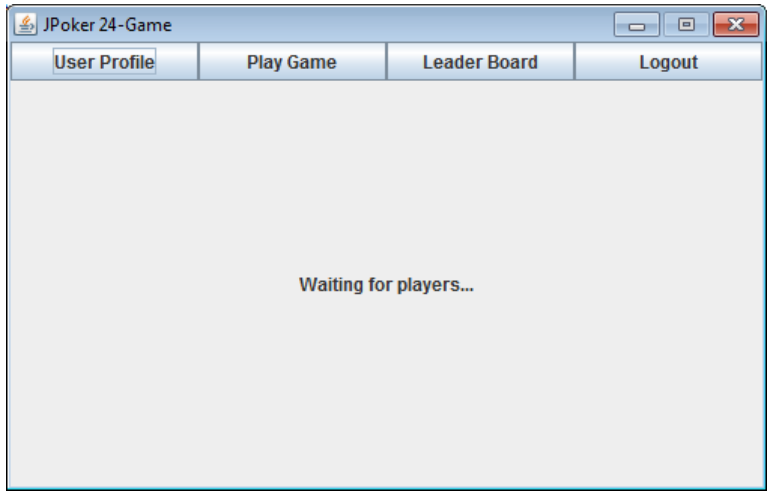
Setting up in Command Line

export CLASSPATH=$CLASSPATH:/path/to/<*GlassFish folder*>/glassfish/lib/ gf-client.jar

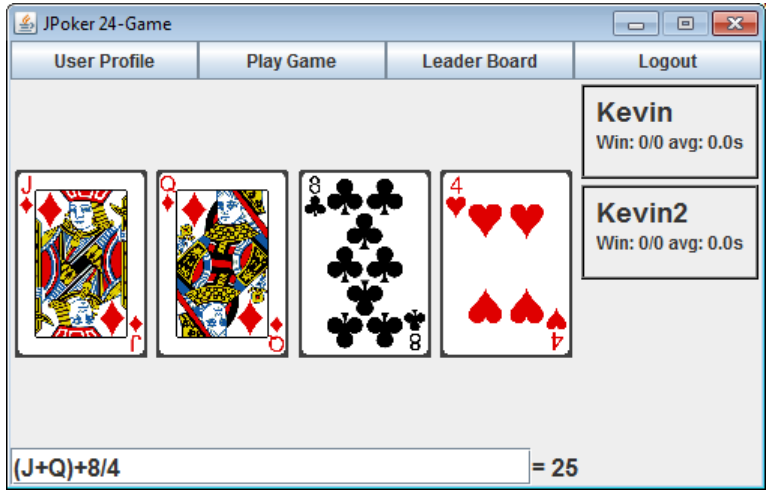
```
leo@ubuntu:~/A3/Test$ export CLASSPATH=$CLASSPATH:/home/leo/glassfish5/glassfish
/lib/gf-client.jar
leo@ubuntu:~/A3/Test$ java QueueSenderExample
Mar 22, 2024 5:38:11 PM com.sun.enterprise.v3.server.CommonClassLoaderServiceImp
l findDerbyClient
INFO: Cannot find javadb client jar file, derby jdbc driver will not be availabl
e by default.
Mar 22, 2024 5:38:13 PM org.hibernate.validator.internal.util.Version <clinit>
INFO: HV000001: Hibernate Validator 6.0.10.Final
Mar 22, 2024 5:38:14 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter: Version:  5.1.3  (Build
 1-a) Compile:  January 27 2019 1625
Mar 22, 2024 5:38:14 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter starting: broker is REMO
TE, connection mode is TCP
Mar 22, 2024 5:38:14 PM com.sun.messaging.jms.ra.ResourceAdapter start
INFO: MQJMSRA_RA1101: GlassFish MQ JMS Resource Adapter Started:REMOTE
Sending message 1
```

Game Stages

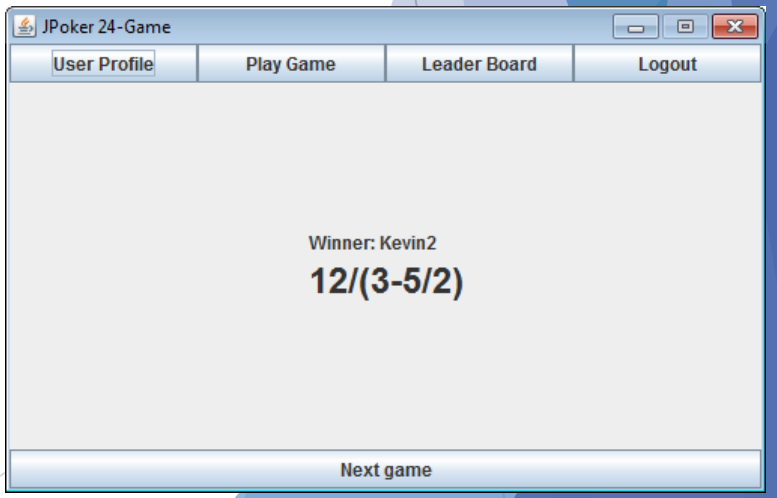
Initial



Game-joining

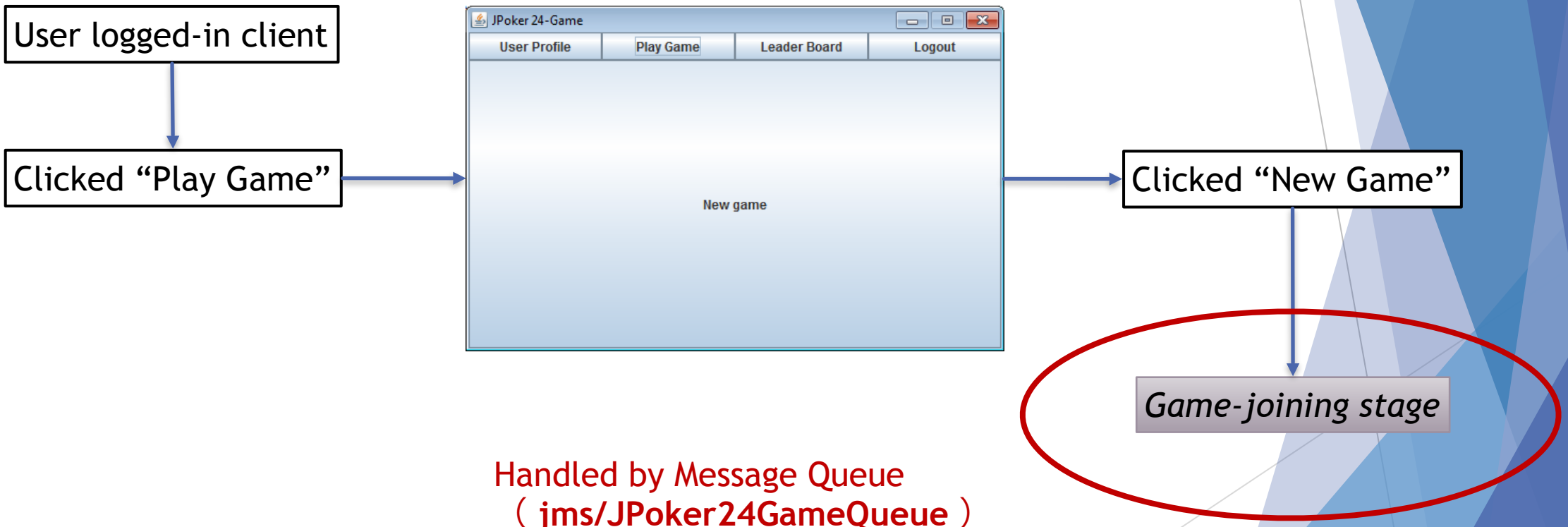


Game-playing



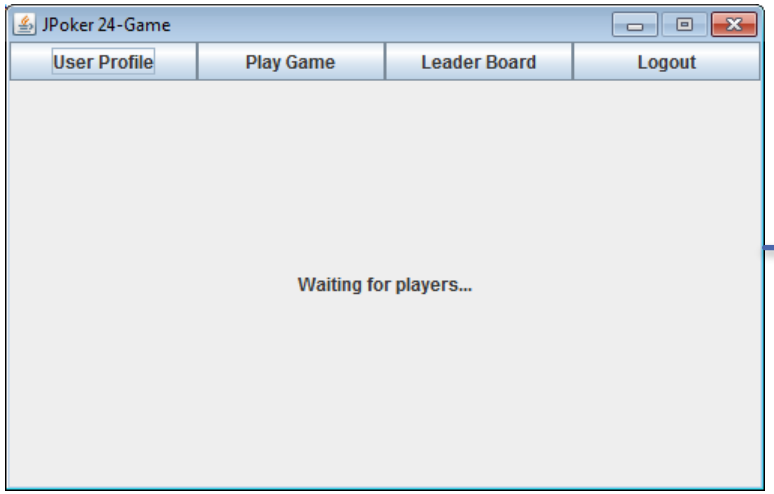
Game-over

Initial stage



Handled by Message Queue
（ **jms/JPoker24GameQueue** ）

Game-joining stage



Server

Inform server

Match player to game

Wait for game ready to start

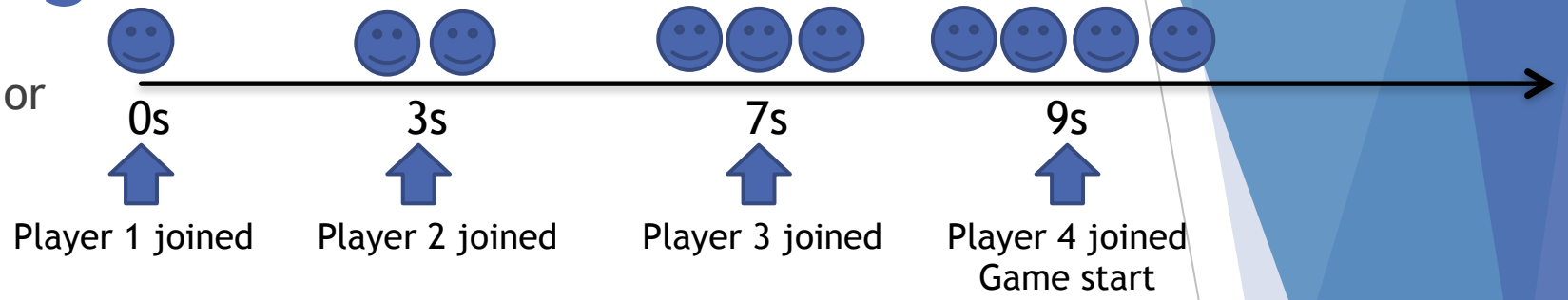
Inform client

Game-playing stage

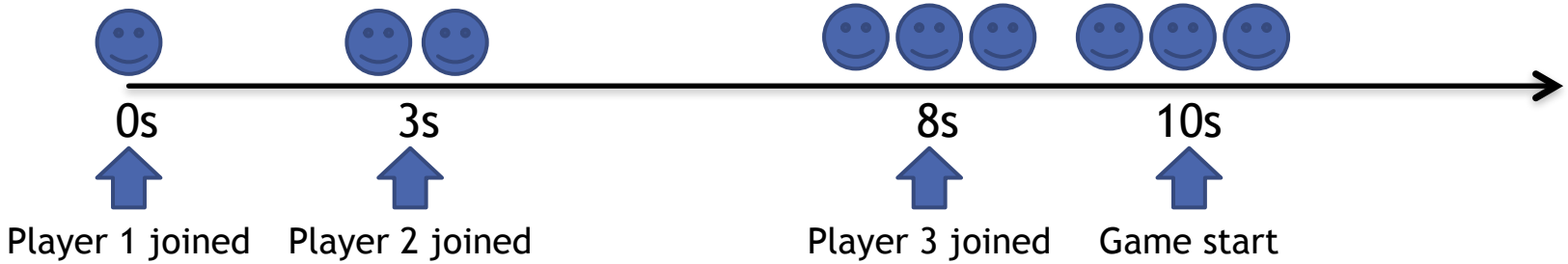
Handled by Message Topic
（**jms/JPoker24GameTopic**）

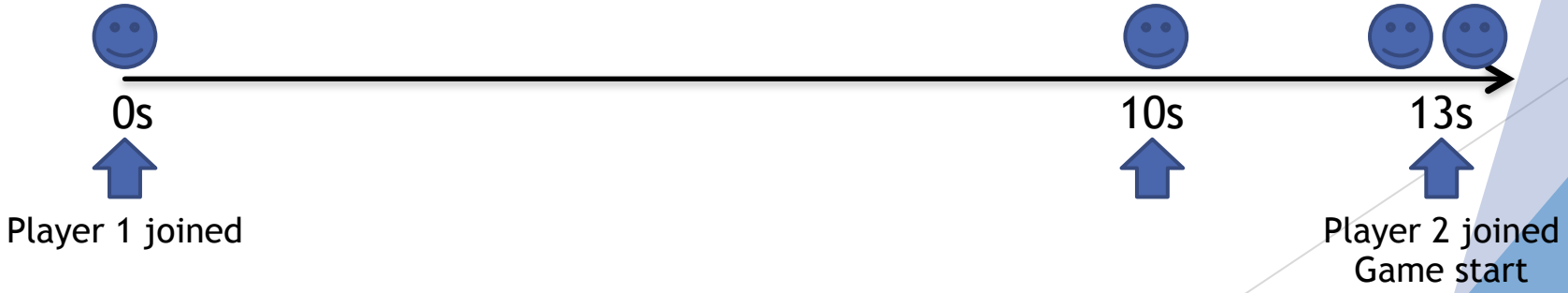
When to start a game?

- When there are **4 players**, or



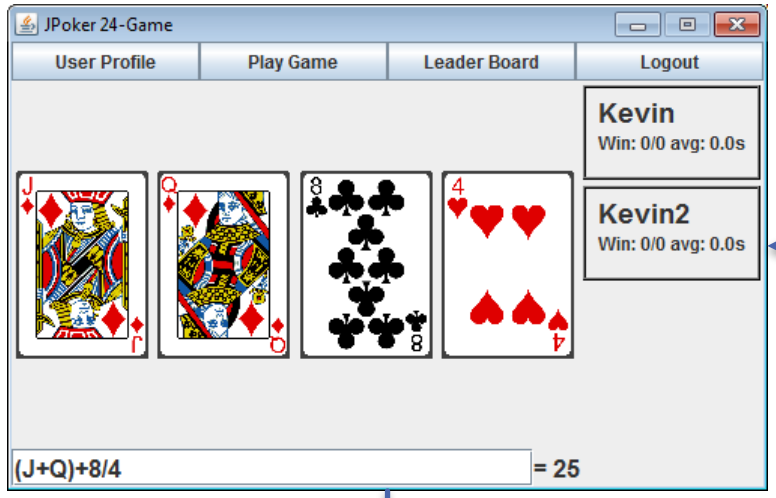
- When there are **2 players** and **10 seconds** has passed since the first player joined





We can assume the server always starts only one game simultaneously.

Game-playing stage



Server

Pick cards and inform client(s)

Submit answer

Validate answer

Update statistics

Inform client(s)

Game-over stage

Update user info and leaderboard accordingly.

Leaderboard

The leaderboard should contain the following info:

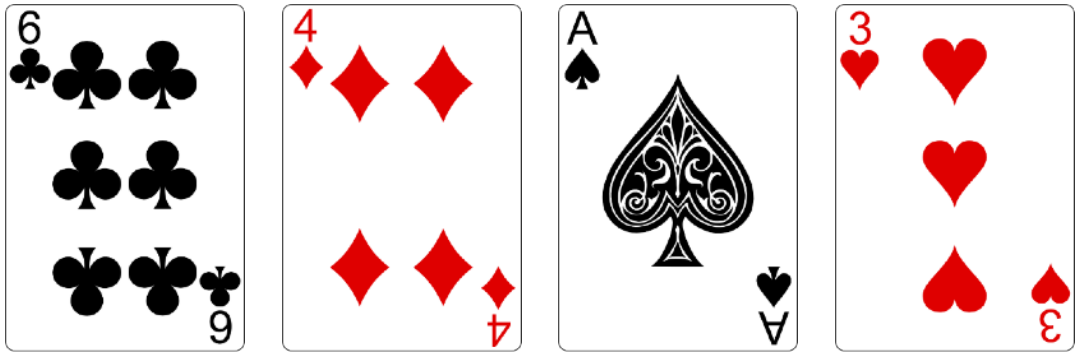
- Rank (ranked according to games win)
- Player Name
- Games win
- Games Played
- Average winning time

Rank	Player	Games won	Games played	Avg. winning ti...
1	Player 4	20	35	10.4s
2	Player 2	18	25	13.2s
3	Player 6	18	31	15.1s
4	Player 8	16	30	12.8s
5	Player 7	10	25	10.2s
6	Player 3	5	7	17.1s
7	Player 5	4	10	15.4s
8	Player 10	1	2	16.2s
9	Player 9	1	4	14.1s
10	Player 1	1	4	18.4s

Do we need transactions in updating leaderboard?

Game rule

- 4 Cards of **different values** should be drawn.
- Suit doesn't matters
- Goal: an expression that equals **24**
- Available operations: +,-,×,÷
- **Parenthesis** can be used to override precedence
- **Fraction** may appear in intermediate result



What is the answer?

https://en.wikipedia.org/wiki/24_(puzzle)

Game-over stage

Clicked “Next Game”

Game-joining stage

Submission requirements

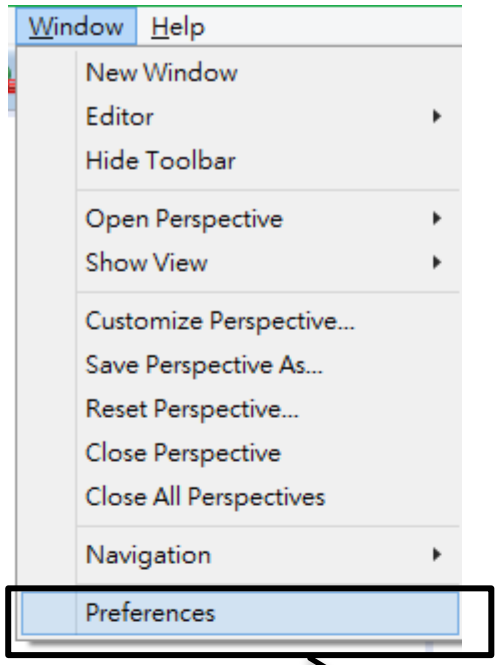
- Submit all your final *.java file(s) and a document (better in pdf format).
  - **JPoker24Game.java**: the main client program
  - **JPoker24GameServer.java**: the main server program
  - **Other source code you have implemented.**
  - **lib.zip** (optional): external libraries used
  - **A document**: The document should include how your program is organized, how to compile your code, how to run your code, and your screenshots of running each of the operations (i.e., the stages mentioned in the slides).

Checkpoints for Assignment3

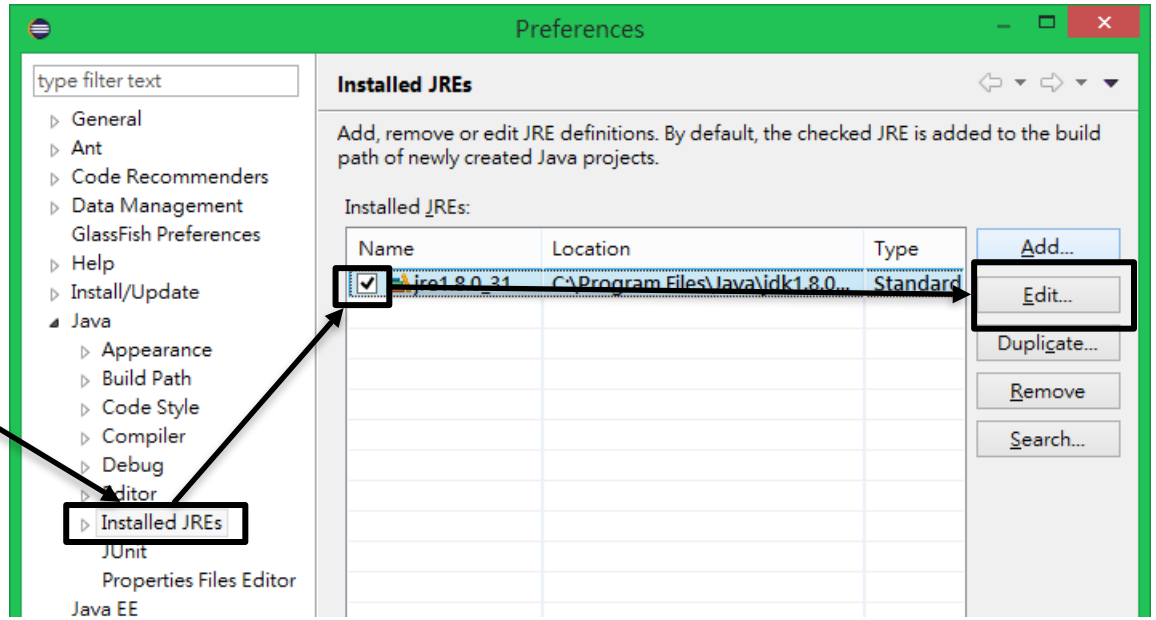
- Handle Gaming-join stage use JMS correctly (30%)
- Handle Gaming-playing stage use JMS correctly (40%)
- Handle Gaming-over stage correctly (5%)
- Update Leaderboard correctly (25%)

Please provide at least one screenshot for each checkpoint.

Backup Slides (Eclipse)
Setting up Eclipse execution environment



It is advised to use the JRE in JDK installation instead of the default JRE installation



Backup Slides (Eclipse)
Set up project in Eclipse

- Create a new project and import the two Java files
- Add **gf-client.jar** to external library in Eclipse (right-click on project → properties)
  - It can be found in **<*GlassFish folder*>/glassfish/lib**

You can now execute the programs in Eclipse