Detailed Design Document for “Think Tank”

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We will implement “Think Tank” using Java and the *libgdx* Java game development library. Our target hardware platforms are desktop PCs running Linux, Mac, or Windows. We chose libgdx because it is a powerful library for developing high performance games in Java that reduces the need for boilerplate code and provides useful high-level constructs such as actors, cameras, renderers, sprites, and more.

ThinkTankClient: Class extends gdx.Game
(Top level class on client side that maintains the connection to server and the stage of the game)
- server: ServerSocket (used by client to send messages to server)
- client: Socket (used by client to receive messages from server)
- stage: Stage

DesktopLauncher: Class (launches the client application)
- main (String args[])

Team: Class
- players: ArrayList<Player>
- brain: Brain
- teamID: int

Player: Class
- tank: Tank
- name: String
- password: String

Brain: Class extends Actor
- health: int (health of base from 0-1000)
- grayMatter: int

GameMap: Class
- camera: Orthographic Camera
- map: TiledMap
- mapRenderer: OrthogonalTiledMapRenderer

BattleMap: Class extends GameMap
- camera: gdx.OrthographicCamera
- map: gdx.TiledMap
- mapRenderer: gdx.OrthogonalTiledMapRenderer

MiniMap: Class extends GameMap
- camera: gdx.OrthographicCamera
- map: gdx.TiledMap
- mapRenderer: gdx.OrthogonalTiledMapRenderer

UtilityBar: Class
(Contains Upgrade Buttons and Gray Matter indicator)

- weaponsUpgradeButton: gdx.ImageButton
- shieldUpgradeButton: gdx.ImageButton
- turretButton: gdx.ImageButton
- grayMatter: gdx.Label
- healthBar: gdx.ProgressBar
- bulletType: gdx.Image

GameStateBar: Class
- team1Health: gdx.ProgressBar
- team2Health: gdx.ProgressBar
- gameTime: gdx.Label

ChatWindow: Class
- chatLog: gdx.TextArea (Scrollable)
- chatTF: gdx.TextField
- sendButton: gdx.Button

Tank: Classs extends Actor
- health: int
- bulletType: Enum
- grayMatter: int
- direction: float
- speed: float
- weaponsEnabled: boolean
- damageValue: int (How much base is damaged when tank is destroyed)
- x: int
- y: int

GameState: Class
(This object will be serialized sent back and forth from the server and client)
- team1: Team
- team2: Team
- turrets: libgdx.collections.Array<Turret>
- bullets: libgdx.collections.Array<Bullet>
- gameTime: int

Upgradable: Interface
- price: int

Bullet: Class extends Actor implements Upgradable
- damage: int
- speed: int
- sps: int (shots per second)
- color: Color

BaseRepairKit: Class implements Upgradable
healthIncrease: int (amount of health returned to the base)

Shield: Class implements Upgradable
- health: int (amount of shield remaining)

Turret: Class extends Actor implements Upgradable

- health: int
- bulletType: Bullet
- team: Team

Screens:

MainMenuScreen: Class implements gdx.Screen

- newGameButton: gdx.TextButton
- joinGameButton: gdx.TextButton
- statsButton: gdx.TextButton
- createViewProfileButton: gdx.TextButton

StatsScreen: Class implements gdx.Screen

- winLossRecordLabel: gdx.Label
- winLossRecord: int
- shotAccuracyLabel: gdx.Label
- shotAccuracy: double
- gamesPlayedLabel: gdx.Label
- gamesPlayed: int
- gamesWonLabel: gdx.Label
- gamesWon: int
- brainsDestroyedLabel: gdx.Label
- brainsDestroyed: int
- tanksDestroyedLabel: gdx.Label
- tanksDestroyed: int
- avgKillsPerLifeLabel: gdx.Label
- avgKillsPerLife: double
- grayMatterExtractedLabel: gdx.Label
- grayMatterExtracted: int

CreateProfileScreen: Class implements gdx.Screen

- nameLabel: gdx.Label
- nameTF: gdx.TextField
- passwordLabel: gdx.Label
- passwordTF: gdx.TextField
- createProfileButton: gdx.Button (validate name – must be unique)

CreateGameScreen extends gdx.Screen

- gameName: gdx.Label
- gameNameTF: gdx.TextField
- minNumPlayers: gdx.Label
- minNumPlayersTF: gdx.TextField
- startGameButton: gdx.ImageButton (validate game name – must be unique name)

WaitingScreen: gdx.Screen

- waitingLabel: gdx.Label

JoinGameScreen: gdx.Screen

- availableGames: gdx.Label
- gameName: gdx.Label (for however many available games there are)
- joinGameButton: gdx.Button (for number of available games)
- refreshGames() (update using Socket)
- waitingForGames: gdx.Label

BattleScreen: Class implements gdx.Screen
- battleScreen: BattleScreen
- utilityBar: UtilityBar
- gameStateBar: GameStateBar
- miniMap: MiniMap
- chatWindow: ChatWindow
- Render()

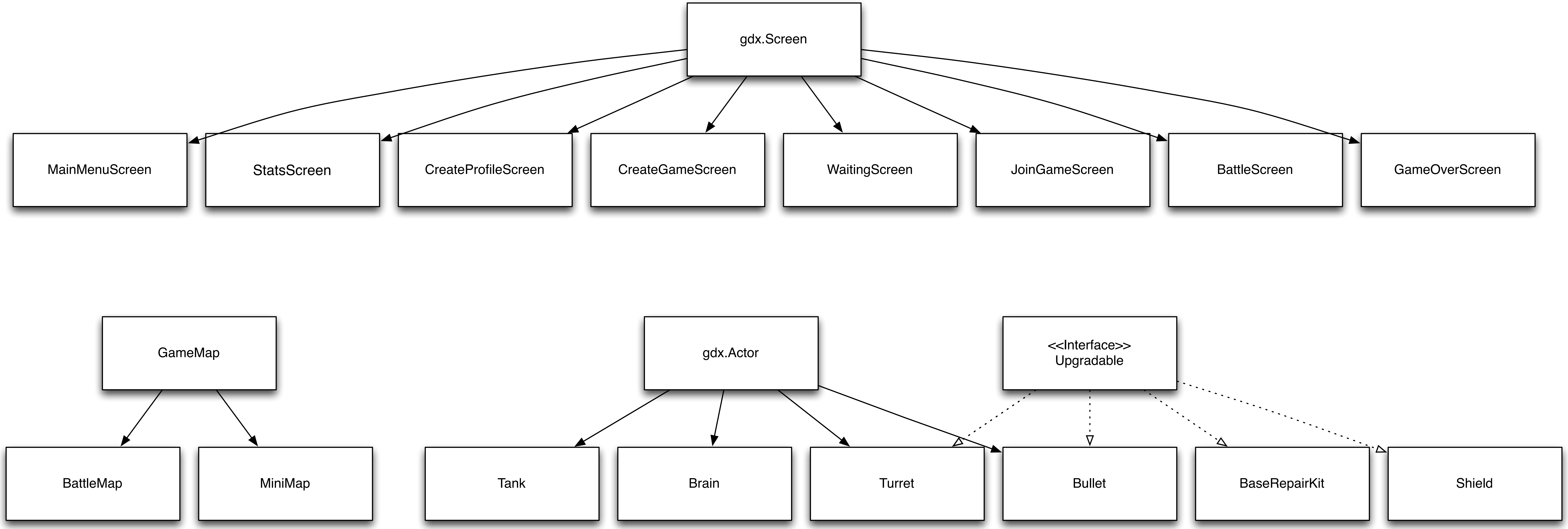
GameOverScreen: Class implements gdx.Screen
- teamLabel: gdx.Label
- kills: gdx.Label (int)
- points: gdx.Label (int)
- team 1: Table (using CellLabels - Kills and Points for each player on team)
- team 2: Table (using CellLabels - Kills and Points for each player on team)
- mainMenuButton: gdx.Button
- newGameButton: gdx.Button

ThinkTankServer: Class
- Games: static Map<int, Game>
- db: connection to the database

GameThread: Class extends Thread(class on server side that manages each game)
- team1: Team
- team2: Team
- ss: ServerSocket (used to receive messages from clients)
- void addPlayer(PlayerThread player, int team)
- boolean isReady()
- boolean isInterrupted()
- void run()

PlayerThread: Class extends Thread
- team: int
- client: Socket (used by server to send messages to client)

Database:
Engine: MySQL
ORM: Java JDBC
Tables:
- Players:
  - - winLossRecord: int
  - - shotAccuracy: double
  - - gamesPlayed: int
  - - gamesWon: int
  - - brainsDestroyed: int
  - - tanksDestroyed: int
  - - avgKillsPerLife: double
  - - grayMatterExtracted: int
  - - name: varchar(255, unique)
  - - password: varchar (255)


gdx.Screen
MainMenuScreen
StatsScreen
CreateProfileScreen
CreateGameScreen
WaitingScreen
JoinGameScreen
BattleScreen
GameOverScreen
GameMap
BattleMap
MiniMap
gdx.Actor
Tank
Brain
Turret
Bullet
<<Interface>>
Upgradable
BaseRepairKit
Shield