**Game Design Report- TankWars**

**Game Description and Features**

The game is a tank battle-themed arcade game where the player controls a user tank, navigating through levels while facing enemy tanks and avoiding obstacles(walls). The game features three levels with increasing difficulty. In **Level 1**, the user controls a single tank, battling three enemy tanks, with walls that explode when hit. The user gains points by destroying enemy tanks and walls. In **Level 2**, the player receives three lives and faces more enemy tanks, along with additional wall blocks, making the game more challenging. **Level 3** introduces even more enemies, walls, and the occasional power-up, which restores the player's health when collected. The game ends when the user’s tank health reaches zero or all enemy tanks are destroyed.

The player can move the tank using the arrow keys, shoot using the space bar, and navigate between menus using keys like "M" for the main menu, "H" for help, and "A" for the about page. When the game is over, the player can view the leaderboard and enter their name. After completing a level, the player is prompted to replay, start a new level, or exit. Scores from different levels are added to a cumulative total, and the leaderboard shows the highest scores.

**Class Diagram**

The class diagram would include the following classes:

1. **Game Class**: The main class that handles the game loop, game state management, and transitions between screens (e.g., main menu, game over, etc.).
2. **Tank Class**: Represents the enemy tanks, handling random movement patterns and health.
3. **Bullet Class**: Represents a bullet fired from the user tank, responsible for detecting collisions with enemy tanks or walls.
4. **Wall Class**: Defines wall blocks that can be destroyed upon impact with bullets.
5. **PowerUp Class**: Manages power-ups that occasionally appear on Level 3, which restore the user tank's health.
6. **MainMenu Class**: Displays the main menu, allowing users to select levels and navigate to help and about screens.

**Reference to Resources Used**

* **Game Graphics and Media**:
  + Tank and wall images were sourced from google search.

<https://www.google.com/search?sca_esv=face10566ce46e9f&sxsrf=ADLYWIKrMDYLCc-OLNpwxASVbntmehjQhg:1733703386261&q=power+up+logo+in+games&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3J7pRxUp2pI1mXV9fBsfh39LpAWJ-Nb3mi2m4EiVUszBizjj7k1tDSauugkDAVOm1ab7mHft6vFbPn2oZc2v3qXB0m8iRqrDW66UZJzxIomTCF_h2nCEF0EMww0jmP7uFoCojNUtePYSyJ9mFAyZJNubuMHtTTpYqYjitP1iPyqtqAEF94A&sa=X&ved=2ahUKEwiqru-ztJmKAxW1ETQIHWUVBuMQtKgLegQIHBAB&biw=1536&bih=695&dpr=1.25#vhid=mXrhDX2AlFiQrM&vssid=mosaic>

<https://www.google.com/search?q=tank+images&sca_esv=face10566ce46e9f&udm=2&biw=1536&bih=695&sxsrf=ADLYWIKCp8VuHBZHu6eNgKXurTn1R7WEjQ%3A1733717050909&ei=OmxWZ-mIN5WnptQP0J-IiA0&oq=tank&gs_lp=EgNpbWciBHRhbmsqAggAMgQQIxgnMgQQIxgnMg0QABiABBixAxhDGIoFMgoQABiABBhDGIoFMgoQABiABBhDGIoFMgoQABiABBhDGIoFMgoQABiABBhDGIoFMgoQABiABBhDGIoFMggQABiABBixAzIIEAAYgAQYsQNI-w1QAFikB3AAeACQAQCYAUKgAfsBqgEBNLgBAcgBAPgBAZgCBKACgwLCAgsQABiABBixAxiDAcICDhAAGIAEGLEDGIMBGIoFwgIFEAAYgASYAwCSBwE0oAemHg&sclient=img>

<https://www.google.com/search?q=explosion+animation+frames&sca_esv=face10566ce46e9f&udm=2&biw=1536&bih=695&sxsrf=ADLYWIL4r9E1SMLzf7smC3gvRoBjCHOp3Q%3A1733717077151&ei=VWxWZ4z9CP79ptQPkJvG2Ac&oq=explostion+an&gs_lp=EgNpbWciDWV4cGxvc3Rpb24gYW4qAggCMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKMgcQABiABBgKSIo0UPsPWKgicAF4AJABAJgBXKAB4AaqAQIxM7gBA8gBAPgBAZgCDqAC-AbCAgQQIxgnwgIKEAAYgAQYQxiKBcICCxAAGIAEGLEDGIMBwgIIEAAYgAQYsQPCAg0QABiABBixAxhDGIoFwgIFEAAYgATCAgQQABgDwgIOEAAYgAQYsQMYgwEYigXCAgoQABiABBixAxgKwgIGEAAYAxgKwgIQEAAYgAQYsQMYgwEYigUYCpgDAIgGAZIHAjE0oAfUYQ&sclient=img>

* + Sound effects for shooting, explosions, and background music were obtained from mixkit.

<https://mixkit.co/free-sound-effects/battle/>

* **Game Development Resources**:
  + The game logic and collision detection were based on resources from MonoGame Documentation, which provides detailed guides on game loop mechanics, input handling, and collision systems.
  + The level design and tank movement mechanics were inspired by tutorials found on [YouTube](https://www.youtube.com/), code with mosh, Udemy and community forums like [Stack Overflow](https://stackoverflow.com/).