COMPSYS302 – Game Rules v3

This is not a final document – more rules may be added as additional functionality is added and as students test and figure things out. The intention is that this document should allow students to make a game that is compatible with other games later on in Phase II. Students are allowed to make additional changes on top of this for their single player game, but as a minimum requirement those games must be able to follow these rules (there can be option settings that turn things on and off for single player mode).

Objects
There are four types of object in this game (sizes are based on a window size of 1024x768 pixels):
1. Walls – 12x12 pixels
2. Tanks – 48x48 pixels
3. Bullets – 8x8 pixels
4. Powerups – 24x24 pixels

For the purposes of collision detection, these are the sizes of the hitboxes. If the object rotates, then the hitbox should also rotate.

There are three types of powerups:
1. Bubble shield (allows tank to be hit once without being destroyed)
2. Speed boost (1.5x) and speed penalty (0.5x)
3. Fire rate boost (1.5x) and fire rate penalty (0.5x)

Object Interactions
Wall <-> Tank = Tank stops
Wall <-> Bullet = Bullet bounces at a complementary angle
Wall <-> Powerup = No change
Tank <-> Bullet = Tank explodes and bullet disappears, opponent gets a point (regardless who fired), tank respawns in a random position (at least 12 pixels away from a wall) after one second
Tank <-> Powerup = Powerup applied to tank and powerup disappears
Bullet <-> Powerup = No change
Tank <-> Tank = Both tanks explode and respawn
Bullet <-> Bullet = Both bullets explode (no respawn)

Object Lifetimes
Walls are permanent and cannot be destroyed (in the multiplayer game). Bullet lifetime is defined as the time it takes for the bullet to get from the left wall to the right wall. Bullets have a linear fire rate: the tank can only fire once every 0.2 seconds. Powerups are discussed below.

Object Speeds
Tanks should move at **3 pixels per frame**, and bullets move at **9 pixels per frame**.

Object Control
The tank is the only object that the player can actively control (they can fire bullets but they have no control after the bullet is fired). Tanks will be controlled using "tank control", where the left and right keys rotate the tank and the up and down keys move the tank forwards or backwards in the direction the tank is currently facing. There are 16 valid directions, in 22.5° increments.

GUI Repaint Rate
For the purposes of synchronising step-based speeds, the refresh/repaint rate of the GUI/window is 30 frames per second (fps).

Powerups

There should be no icon indicating which powerup it is; when consumed, a random powerup effect (including negative effects) is applied. Powerups can spawn anywhere where there is not currently a tank or wall, and do so in a random position. The lifetime is 10 seconds or until they are consumed, whichever happens first. Only one powerup effect can be active at a time, consuming another powerup replaces the previous effect. Effects last for 15 seconds. Up to 3 powerups spawn randomly in each 30 second time period.