Homework 2: Finite State Machines
GAM 376, Prof. Robin Burke
Winter 2008
Due: 1/17/2008

You are designing an NPC tank for a military FPS game. Design and draw a finite state machine for the behavior of the vehicle as described below:

- Create a table that lists all of the states and their properties.
- Create a table of game conditions that will be used to transition between states. Develop abbreviations to use when labeling transitions.
- Draw a diagram that includes the states and their transitions. The drawing tools in Powerpoint are probably sufficient for the task, but you may also wish to use a more sophisticated tool like Visio.

You should assume that the animations are run asynchronously. That is, a game state may trigger an animation to start, but it will need to test some condition to determine when the animation has finished.

**Initialization**
The tank becomes active when the level is initialized. It will wander about the "patrol zone" portion of the level. In this state, the turret is always pointing the same direction as the direction of travel.

**Combat**
The tank will engage with the player when a) he enters into the field of view of the turret, or b) when he fires a weapon. When in combat, the tank's turret will track the player and fire at a fixed rate. The tank will also turn towards the player, but the turret can turn faster. If the player is out of view behind a non-destructible object (like a rock), the tank will cease fire but continue to track the location where the player was last seen. If the player is behind a destructible object (like a Jeep), the tank will reorient its fire to destroy the obstacle – it will shoot at the object rather than the player. The tank's main gun cannot fire closer than 50 meters, so the tank will try to maintain at least this distance to its target.

If the player comes within 50 meters of the tank, its machine gun will fire in bursts. The machine gun will not attempt to destroy obstacles. If the player gets closer than 10 meters, the tank will cease trying to move to main gun distance and will instead aim at the player to crush him. All firing ceases while this is happening, but begins again if the player evades.

If the player hits the tank with a RPG or hand-thrown grenade, it will cease firing while an explosion animation is shown. If the tank’s health is less than 25%, it will begin emitting smoke and the main gun will cease functioning, leaving only the machine gun.

**Termination**
If the player’s health is reduced to zero, the tank heads back towards the patrol zone. If the tank's health is reduced to zero, it explodes in a fireball.

**What to turn in:**
Submit your tables and diagram to Course On-Line under Homework #2.