**Whac-A-Bug**

**Fall 2014**

**INTRODUCTION**

You are working for a game design company and given the task of designing and implementing a new role playing game (rpg).

**The GAME SCENARIO**

The country of Renovian is overrun with bugs. The bugs are evil creatures that live below the surface in bug-holes and when triggered attack human beings. The bugs come in various forms: hornets, killerants, and spiders and move through the land in different ways, attacking all humans in their path.

There is a group of humans that are charged with ridding the country of these nefarious creatures. The key is to find the bug-holes that release the bugs and kill the bugs as they surface.

The humans have different strengths. Warriors are strong hand-to-hand fighters whereas Explorers are more skilled with range weapons. Players move around the board trying to stay alive and kill as many bugs as possible.

**THE DICE**

A DieClass will be provided for this project. It will have accompanying files for input and require a specific syntax.

Dice Notation:

D4 = four sided die

D6 = six sided die

D8 = eight sided die

Die rolls are expressed in the format:

[#] die type [+/- modifiers]

Example: 3D6+2 means: "Roll 3 six sided dice. Add the result of the three dice together. Add 2."

**THE BOARD**

The game board will be a grid of varying dimensions. The default size will be 3 rows by 4 columns but could be constructed to have any dimensions. Each of the row/column intersections will be called a cell. A single cell has many properties and behaviors. Each cell is uniquely identified by its coordinates (row, column). There is terrain that affects the ability for a player to enter or to exit the cell. It also affects the ability to shoot long range weapons. Cells have traps that are tripped when a player enters the cell. Some traps are triggered once. Each cell also has zero or more occupants that are players. A player can be either a bug or a human. A player’s forward movement is determined by the type of player. If the edge of the board is encountered then the board will “wrap” to the other side. (Example: if [2, 1] is at the end of a row; then the next cell in the forward direction is [0, 1].) This wrapping only effects movement and is not used for line of sight with range weapons.

Attributes of a cell:

**coordinates**: this is the row and col that uniquely id this cell.

**occupants**: list of players on this cell

**terrain**:

CLEAR – flat terrain with clumps of no-effect vegetation.

MNT – impassable mountainous terrain that blocks line of sight (LOS) and cannot enter the cell.

ROCKY - rocky terrain that blocks line of sight (LOS) and slows movement to half speed (momentum is reduced by 2 when cell is entered).

SWAMP – jungle swamp terrain with vegetation slows movement to half speed (momentum is reduced by 2 when cell is entered).

**trap**:

NO\_TRAP – there is no trap on this cell.

BUG\_HOLE – Bug hole trap. Player activates bug hole, releasing the bugs. The player engages in combat with each bug. Until the bug is dead, the player is dead, or the player is no longer occupying the cell with the bug.

LAND\_MINE – Landmine trap. The player activates the landmine which causes damage to the player’s health. The amount of damage is determined by the landmine.

SINK\_HOLE – Sinkhole trap. The player activates the sinkhole causing a reduction in the player’s speed. The amount of the reduction is determined by the sinkhole.

**PLAYERS**

The players are one of five types: Warrior, Explorer, Hornet, KillerAnts, or Spiders. Each behaves either as a bug or a human. A human is created by an end-user and placed on the board at coordinates [0, 0]. Bugs are created at the start of the program and loaded into bug-holes. Each bug has the starting coordinates of the bug-hole and do not participate in game movement until released from the bug-hole.

Attributes of a player:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Warrior (Human)** | **Explorer (Human)** | **Hornets (Bugs)** | **KillerAnts (Bugs**) | **Spiders (Bugs)** |
| name | name | name | name | name |
| cell | cell | cell | cell | cell |
| health | health | health | health | health |
| willpower | willpower | willpower | willpower | willpower |
| max speed | max speed | max speed | max speed | max speed |
| current speed | current speed | current speed | current speed | current speed |
| power | power | power | power | power |
| physical damage | physical damage | physical dam | physical damage | physical damage |
| def armor value | def armor value | def armor value | def armor value | def armor value |
| weapon skill | weapon skill |  |  |  |
| weapon | weapon |  |  |  |

**NAME** - Player’s name (string with possible whitespace)

**CELL** - The cell associated with the player’s position on the board.

**HEALTH** - The amount (int) of damage a player can sustain before death occurs.

**WILLPOWER** – (int) determine the players will to fight.

**MAXIMUM SPEED** - The maximum speed/coverage for a player (int number of board cells)

**CURRENT SPEED** - The current speed/coverage for a player (int number of board cells)

**POWER** - The overall power of the player.

**PHYSICAL DAMAGE** – The damage a player can inflict in hand to hand combat.

**DEFENSIVE ARMOR VALUE** - This is a numeric value assigned to different types of armor

**WEAPON SKILL** – The skill level for the range weapon.

**WEAPON** – **Range** weapon the human is wielding.

**INITIALIZATION of PLAYERS**

All of the statistics that define each player are pre-generated using the following table values:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Warrior** | **Explorer** | **KillerAnt** | **Spider** | **Hornet** |
| **health** | 81 | 42 | 20 | 50 | 60 |
| **willpower** | 9 | 7 | 7 | 8 | 9 |
| **max speed** | 5 | 8 | 2 | 15 | 8 |
| **current speed** | 5 | 8 | 2 | 15 | 8 |
| **power** | 9 | 6 | 5 | 11 | 10 |
| **physical damage** | 3D6 | 1D6 | 2D6 | 2D6 | 3D6 |
| **def armor value** | 8 | 0 | 10 | 7 | 8 |
| **weapon skill** | 5 | 10 |  |  |  |
| **weapon** | assault rifle | pistol |  |  |  |

**COMBAT**

There are two basic types of combat. The first is melee (hand-to-hand), the other is ranged combat (use of a weapon). Humans are more “advanced” than bugs. Humans use ranged weapons which make “pink mist” out of the bugs. Humans only choose hand-to-hand combat if they do not have a weapon. The bugs are big and bad and choose the classic “slice and dice” melee combat.

Combat exists between two players if they are enemies. One is identified as an attacker and one as a target. The attacker must determine the hit score and look up the value in the **Hit Table**. Based on the **Hit Table** further processing may be needed. The attacker may need to consult the **Impact Table**. If that indicates a critical wound (-1) then the target should consult the **Critical Wound Table**.

**WEAPONS**

Each weapon is defined below. These are allotted a Damage Value equal to 1 to 3 six sided dice (D6) and a separate Power Rating to be used on the **Impact Table** when a target has been hit. Here is a brief description of the weapons carried by the humans.

Pistol – Pretty pathetic. Save a bullet for yourself if this is all you have to fight the bugs with.

Assault Rifle – Much better. A must for “bug hunts”.

Grenade – Never can have enough grenades.

Heavy weapon – Now this is what serious “bug hunters” carry around.

**WEAPONS TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Weapon** | **Effective Range** | **Damage** | **Power** |
| Pistol | 1 | 1D6 | 5 |
| Assault Rifle | 3 | 2D6 | 11 |
| Grenade | 2 | 2D6 | 11 |
| Heavy Weapon | 4 | 2D6 | 9 |

Effective Range - This is the effective range of the weapon in cells.

Damage - Roll this many six-sided dice and add them up for the damage inflicted by the weapon.

Power - The stopping power of the weapon, higher the better.

**LINE OF SIGHT**

Although the ranges of many weapons are great remember that to shoot something you must see it. A straight line from the shooter (in the direction the shooter is facing) to the target is called Line of Sight. Line of Sight extends across the whole grid and is blocked only by terrain, and sometimes other players that might be friends.

**GAME PLAY**

All players are created at the start of the game. Bugs are dormant (inactive) until their bug-hole is triggered. Players can also be inactive because they are dead (health <=0). When it is a player’s turn, if the player is active then play occurs as follows:

**Human players:**

A human player’s action is determined by the end-user. An example of this interface will be provided.

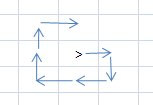
At the start of a player’s turn the board is printed for the player. The player can choose to pass and be healed or take his turn. The number of cells a player can move this turn is determined by the player’s current speed (momentum). The player can choose the direction to move and the number of cells. This can be repeated until the player is finished moving or is “exhausted” (used up the entire momentum). Once movement is done the player can choose the direction to fire or to engage in melee.

If a player decides to move forward the movement could be interrupted by terrain or a trap. Each cell must be able to be “entered” before deducted from the momentum. If the terrain prevents forward movement then the player must stop and change directions (back to prompting for direction and number of cells). If the trap causes the player’s willpower or health to fall to zero or less (thus rendering the player inactive) then the player’s turn is over and the player is dead.

Healing occurs when a player passes. The player’s speed is returned to maximum speed and +10 is applied to the player’s health.

The player’s turn is over when he is healed or all momentum is depleted, combat transpires, or the player is dead.

**Bug players:**

If a player is a bug then the action is determined by the type of bug. If an enemy is in the current cell then the bug will engage in melee immediately. If there is no enemy in the current cell then the bug’s momentum is determined by the current speed. A bug will always initially go forward in the east direction. If the cell to the east cannot be “entered” then the bug will “turn right” (south) and try that direction. This algorithm is continued until the bug is able to deplete momentum by at least one.

A **spider** will move in a square spiral initially going east (if unable to move east, then move south, etc) using current speed as momentum. Each cell must be able to be “entered” or progress stops. If an enemy is encountered the spider will stop and engage in a melee attack. The turn is over when the spider cannot continue due to terrain, momentum, death or has engaged in a melee attack.

A **killerAnt** will always initially try to move east until an enemy is encountered, progress is stopped or momentum is depleted. If initially the ant cannot move east then it will move south and continue in that direction. If it is unable to initially move south, then it will move west etc. If an enemy is encountered the ant will engage in a melee attack. The turn is over when the killerant cannot continue due to terrain, momentum, death or has engaged in a melee attack.

A **hornet** flies forward across the board (initially in the east direction) and lands on every other cell. The momentum is depleted by one for each cell it actually “enters” (i.e. lands in). If an enemy is encountered the hornet will engage in a melee attack. The turn is over when the hornet cannot continue due to terrain, momentum, death or has engaged in a melee attack.

**TARGET SELECTION**

When a player is Active he may fire at the end of his movement at any target in line of sight or engage in melee. Ranged targets are selected arbitrarily (if an enemy is found first then they are a target).

A player may attack another player in hand-to-hand combat (melee). During each round of melee the first attack will always go to the “Activated” player. Melee only occurs between enemies in the same cell.

**SCORING A HIT**

The only difference between melee and ranged weapon fire when it comes to “scoring a hit” or inflicting damage is the distance or range of the weapons. Melee may only be used when in contact with the enemy (in the same cell). Ranged weapons however may be fired up to their effective range as listed on the weapons table. To score a hit, first declare who the attacker is and who the target is. Immediately roll **2D6** and consult the **Hit Table**. Total the dice score and read the appropriate line on the table to see if a hit is scored.

**HIT TABLE**

|  |  |
| --- | --- |
| **Score** | **Results** |
| **2** | Critical wound! |
| **3** | If range then Miss else Flesh wound! |
| **4** | Miss! |
| **5** | Critical wound! |
| **6** | If range and wpnSkill <= 5 then Miss else Flesh wound! |
| **7** | If melee and target can run then Run! else Miss! |
| **8** | If melee and target can run then Run! else Critical wound! |
| **9** | If Target speed >=8 then Miss! else Flesh wound! |
| **10** | If melee and target can run then Run! else Miss! |
| **11** | If wpnSkill >= 9 then Critical wound! else Flesh wound! |
| **12** | If melee and target can run then Run! else Flesh wound! |

**Critical wound!** The attacker has inflicted heavy damage to the target. Damage is calculated as follows. Take the attackers Weapon Skill for range weapon or Power for melee; add the score from the Damage Value of the weapon used or Physical Damage of attacker if melee. This Damage minus the target’s Defensive Armor Value is immediately removed from the target’s Health. In addition the attacker is allowed to roll 2D6 on the **Impact Table**.

**Flesh wound!** The attacker has inflicted light damage to the target. Damage is calculated as follows. Take the attackers Weapon Skill for range weapon or Power for melee; add the score from the Damage Value of the weapon used or Physical Damage of attacker if melee. This Damage minus the target’s Defensive Armor Value is immediately removed from the target’s Health.

**Run!** The target runs to the cell to the north if possible.

**Miss!** The attacker has missed the target.

Other results apply to certain weapons or situations. For example a roll of 9 would score a Miss to any target moving fast at 8 or higher, otherwise all others would receive a Flesh wound.

After a non-Active player has been attacked (was the target) in melee and is still living and in the same cell as the attacker then the player may immediately attack the Active player. (Attacker becomes the target and the target becomes the attacker).

**IMPACT AND POWER**

Those inflicting a Critical wound whether by hand to hand or from ranged weapon fire are allowed to roll 2D6 and consult the **Impact Table**. A Critical wound is a potentially mortal wound. The attacker totals the dice roll and checks this score on the column appropriate for his Power Rating if in hand to hand combat or the Power Rating of the weapon for ranged combat. If the result is a number then this sum is immediately subtracted from the targets Health and all damage is finished. If the result is a “W” then 10 points are immediately subtracted from the target’s Health and the target has been knocked to the ground and decreases his current speed by half. In addition the target must roll 2D6 on the **Critical** **Wound Table** to see if he has sustained a mortal wound.

**IMPACT TABLE**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Die Roll** | **Power Rating** | | | | | | | | | | |
| **12** | **11** | **10** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** |
| **12** | w | w | w | w | w | w | w | w | w | w | 10 |
| **11** | w | w | w | w | w | w | w | w | w | 10 | 9 |
| **10** | w | w | w | w | w | w | w | w | 10 | 9 | 8 |
| **9** | w | w | w | w | w | w | w | 10 | 9 | 8 | 7 |
| **8** | w | w | w | w | w | w | 10 | 9 | 8 | 7 | 6 |
| **7** | w | w | w | w | w | 10 | 9 | 8 | 7 | 6 | 5 |
| **6** | w | w | w | w | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| **5** | w | w | w | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| **4** | w | w | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
| **3** | w | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| **2** | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**WOUND AND WILLPOWER**

After a target has received a Critical wound and a result of “W” on the **Impact Table** he must roll 2D6 and total his score and consult the **Critical Wound Table**. The target totals the dice roll and checks this score on the column appropriate for his Willpower Rating. If the result is a –1 then he immediately reduces his Willpower by 1 point and damage is finished. If the result is a “K” then he is dead. Dead, dead.

**CRITICAL WOUND TABLE**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Die Roll** | **Willpower Rating** | | | | | | | | | | |
| **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **12** | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| **11** | k | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| **10** | k | k | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| **9** | k | k | k | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| **8** | k | k | k | k | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| **7** | k | k | k | k | k | -1 | -1 | -1 | -1 | -1 | -1 |
| **6** | k | k | k | k | k | k | -1 | -1 | -1 | -1 | -1 |
| **5** | k | k | k | k | k | k | k | -1 | -1 | -1 | -1 |
| **4** | k | k | k | k | k | k | k | k | -1 | -1 | -1 |
| **3** | k | k | k | k | k | k | k | k | k | -1 | -1 |
| **2** | k | k | k | k | k | k | k | k | k | k | -1 |

**DEATH AND HEALTH**

When a player’s Health reaches “0” (or negative) the player is dead. This combination of damage and stress has resulted in the player losing its will to continue. When this occurs the player’s Willpower is also reduced to “0”.