UNIVERSITY OF LINCOLN

Liam Berridge - Brigadier.im.com

Software Engineering

CMP3111M

Liam T. Berridge BER14475946

Introduction

For this assignment the given task is to work within the constraints of an agile methodology, specifically SCRUM. To do so teams have been assigned, with the roles of individual group members up to the team's own designation. It is up to the teams themselves to ensure all members contribute to each role within the SCRUM methodology at least once over the course of the assignment. The teams are free to contribute to either a predefined open-source project or, once verified by the module leader, any other open-source project. Teams must ensure that they log activity related to the assignment to assist in their critical reflection. Contributions made to the project must be done so over GitHub, with proper documentation of how GitHub contributed to the assignment.

Open-Source Project

For this assignment, the open-source project chosen was Open Red Alert (OpenRA); A recreation of an older title to run on newer hardware with significant overhauls to the core system, without changing the gameplay itself. The project has been in development since as early as 2007, however active development only began in 2010, with up to 100 commits monthly. The project is still active, with additions, bugfixes and modifications being made up to twenty times per week. The current GitHub backlog of the project also extends to over 1,000 open issues flagged by the main developers and contributors. The project has been branched, opposed to cloning, meaning fixes and changes can be requested to be added to the official repo.

Although development has continued for an extended period of time, the game is actually a modification of a core platform, this means other Command & Conquer titles made in the same style can be recreated and deployed to the platform with only minimal required effort. Thus far the ported titles consist of Dune 2000, Red Alert & Tiberian Sun. The chosen focus for the project was Red Alert however, being the title in most active development.

This project was chosen as it offered an easier medium to understand, with all team members being familiar with the content and structure of the domain without requiring extended research.

The repository for the project is available at:
https://github.com/OpenRA/OpenRA

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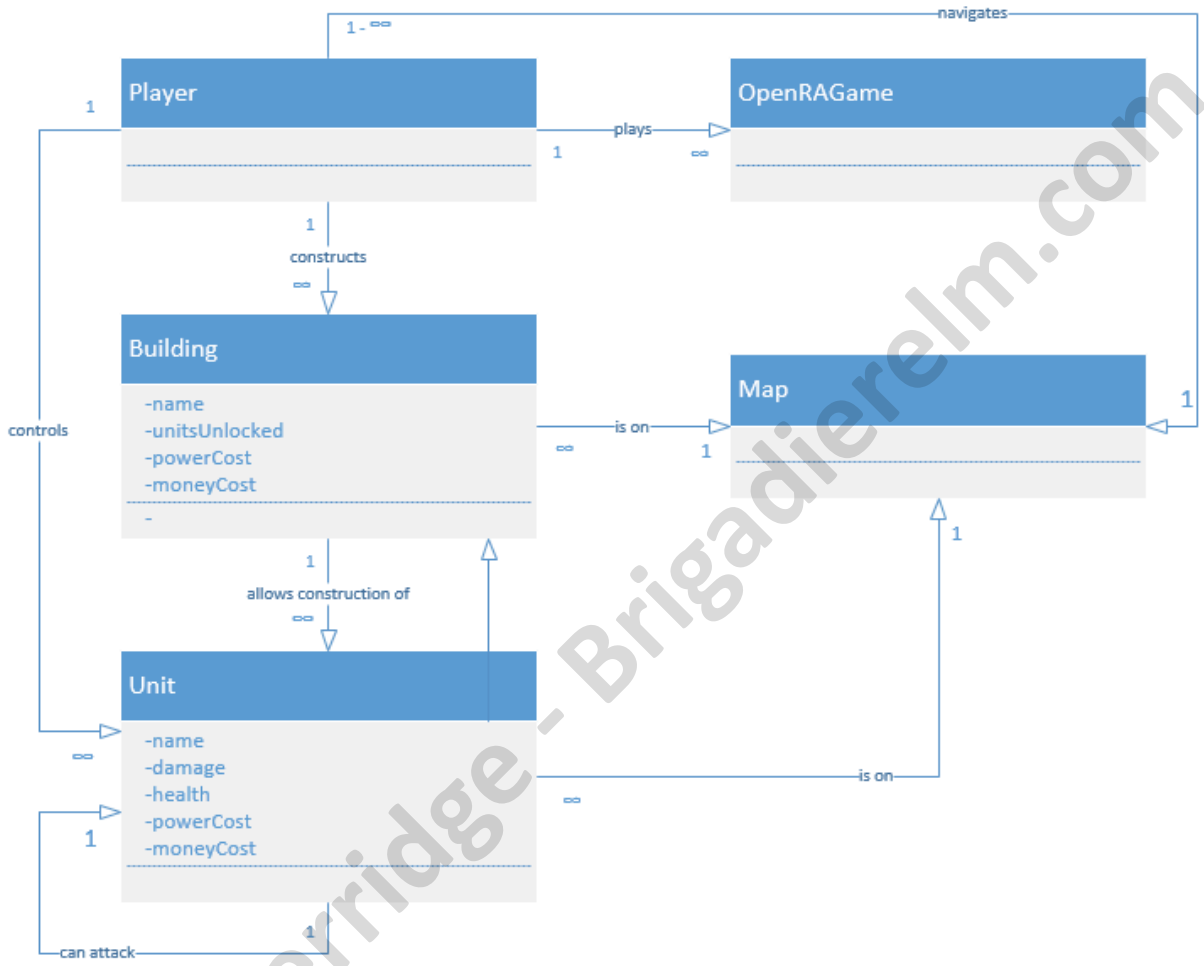
Domain Model Analysis

Domain Model



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Analysis of Domain Model

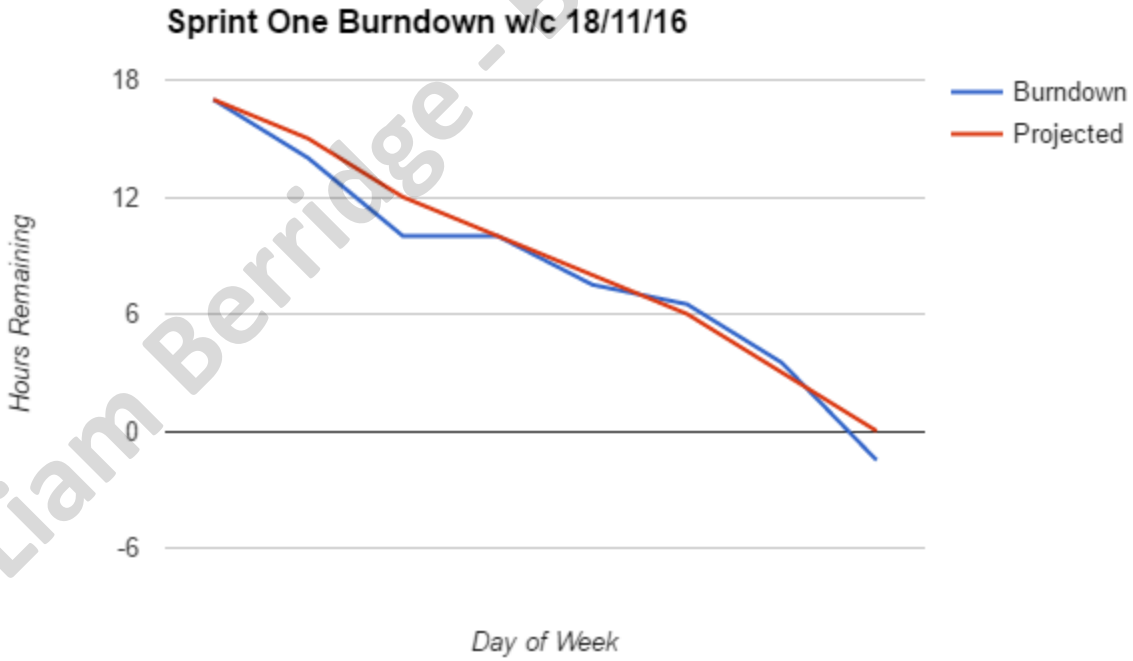
Sprint Logs

Sprint 1 -

Logs

The first sprint saw a compilation of a backlog of issues to fix, which was taken from the official repositories issue list on GitHub. Each team member assigned their own roles within the group and picked an issue from the backlog to test or attempt to fix. Tom Barden and Tom Robertson were assigned as testers for the first sprint, whilst Adam Walker, Jake Lyons and Liam Berridge were developers.
Tom Barden also took on the role of SCRUM master for the first sprint, which involved ensuring the other team members were confident proceeding with the chosen task for the rest of the sprint. The team also played the game before leaving the weekly SCRUM to ensure all members were fluent in the software they would be working on. During the course of the week, all members of the team contributed to the various roles, as shown in the burndown and product backlog.
The sprint burndown for this week was created by Tom Barden as SCRUM master.

Burndown



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Burndown Table

Week Commencing	18/11/16								
Role	Name	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Individual Total
Test/SM	Tom B	2			1		2		5
Dev	Adam W	2	2		0.5		1		5.5
Dev	Liam B	2	2		1	1			6
Test	Tom R							2.5	2.5
Dev	Jake L							2.5	2.5
	Total Hours	6	4	0	2.5	1	3	5	21.5
	Burndown	16	12	12	9.5	8.5	5.5	0.5	
	Projected	19	16	13	10	7	4	1	

Sprint Backlog

Issue	Time Allocation	Members
#12300 - Crash/Boot issue when no audio device connected. (Solved)	6	Liam Berridge,Tom L Barden (Pair)
#5968 - Units stop pathing if collision	5	Adam D Walker
#12233 - Flamethrower units not exploding on death	2	Jake Lyons
Testing #12233 - Flamethrower units not exploding on death	4	Tom Robertson

Contributions

During the first sprint, Liam and Tom Barden committed a workaround for the chosen issue, where a graceful fail was implemented as to fix the actual issue would require working on the OpenAl system itself, which is a separate program. The implemented fail would output a new error log, which asks the user to connect an audio output device. This change would be placed into the OpenRAGame class on the domain model. Below is evidence of the commit and code. The commit was delayed due to a synchronisation error. On the following page is a pair programming log along with which area of the domain model was changed.

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OpenAL Sound Logging Browse files

Better sound logging with a simple fix added to the debug logs.

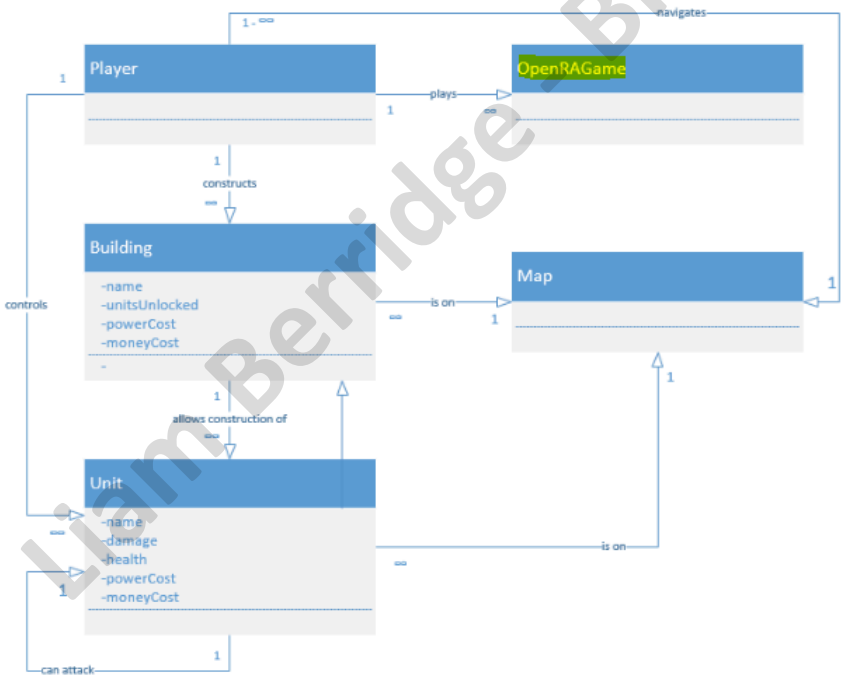
bleed

UpRooster committed 25 days ago 1 parent e7e17a0 commit ef00d1ad8bab1e8c1324b205722230ea4be309ad

Showing **1 changed file** with **15 additions** and **2 deletions**. Unified Split

17 OpenRA.Game/Sound/Sound.cs View

```
@@ -44,8 +44,21 @@ public sealed class Sound : IDisposable
44  44
45  45          public Sound(IPlatform platform, SoundSettings soundSettings)
46  46          {
47      -           soundEngine = platform.CreateSound(soundSettings.Device);
48      -
    47  +           if (soundSettings.Device != null)
    48  +           {
    49  +               try
    50  +               {
    51  +                   soundEngine = platform.CreateSound(soundSettings.Device);
    52  +               }
    53  +               catch (Exception e)
    54  +               {
    55  +                   Log.Write("sound", "No sound device found, connect headphones or speakers:\n{0}", e);
    56  +               }
    57  +           }
    58  +           else
    59  +           {
    60  +               soundSettings.Device = null;
    61  +           }
49  62              if (soundSettings.Mute)
50  63                  MuteAudio();
51  64          }
```



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Sprint 2 -

Logs

During the second sprint, the team shifted roles to make Liam the SCRUM master and a tester, whilst Tom Barden and Tom Robertson along with Jake were developers. Adam was also a tester for the second sprint. Jake and Tom Robertson chose to pair program for issue #12065, whilst Tom Barden took over the issue previously being undertaken by Adam, #5968. During this sprint, Liam also made corrections to his previous commit, as the game would no longer function due to a coding error. The sprint burndown for this week was created by Liam as SCRUM master.

Whilst Liam was SCRUM master, he took control over the trello backlog along with hosting the weekly SCRUM. This involved ensuring all team members that attended the weekly SCRUM were able to feedback their work, along with any new difficulties or knowledge garnered about the software domain. The team then chose their new roles for the week ahead along with issues from the backlog. The weekly SCRUM meeting hosted the planning, review and retrospective meetings as necessitated by the methodology, where the previous and future progress was discussed, as well as a review of the overall progress. The SCRUM master was used to direct the meeting, however the role has no decision making power. This is seen as a positive of SCRUM, as members are free to control the work they do, empowering them and giving them the motivation to work. Liam created the below burndown for the second sprint, showing how there was a lull at the beginning of the sprint where little activity occurred, however this then sped up as the week continued, catching up to projected burndown at the sprints end.

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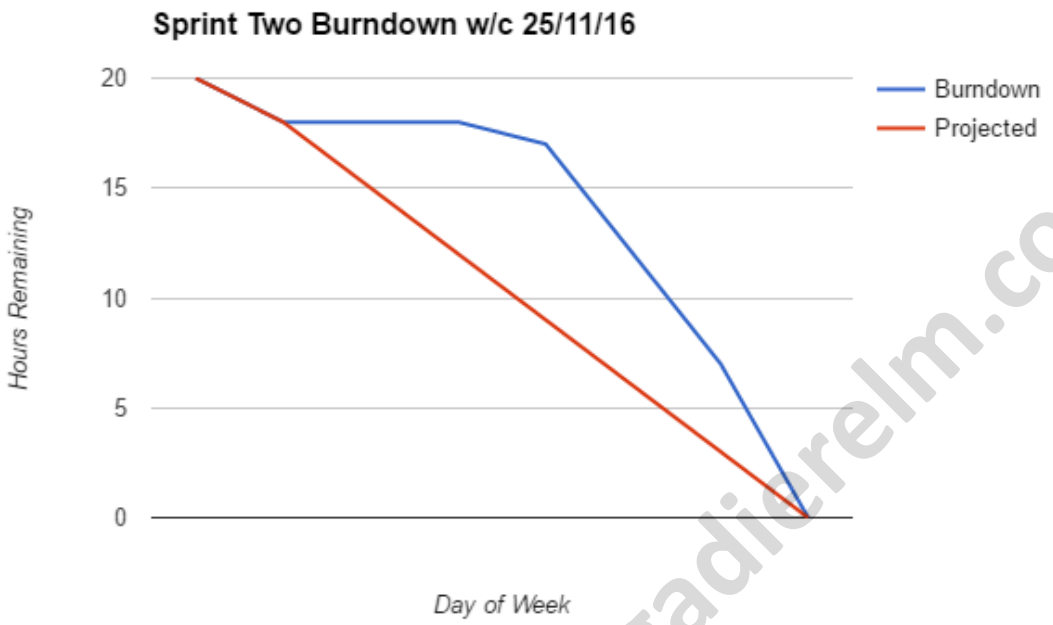
Burndown



Burndown Table

Week Commencing	25/11/16							
Role	Name	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Individual Total
Dev	Tom B	3						1	4
Test	Adam W					3	1		4
Test/SM	Liam B	1				2	2	2	7
Dev	Tom R						1	2	3
Dev	Jake L				1		1	2	4
	Total Hours	4	0	0	1	5	5	7	22
	Burndown	18	18	18	17	12	7	0	
	Projected	19	16	13	10	7	4	1	

Sprint Backlog

Issue	Time Allocation	Members
#12065 - AI Players will not seek ore after it has expired	6	Jake Lyons, Tom Robertson (Pair)
#5968 - Units stop pathing if collision	4	Tom Barden
Testing #12233 - Flamethrower units not exploding on death	10	Liam Berridge, Adam Walker

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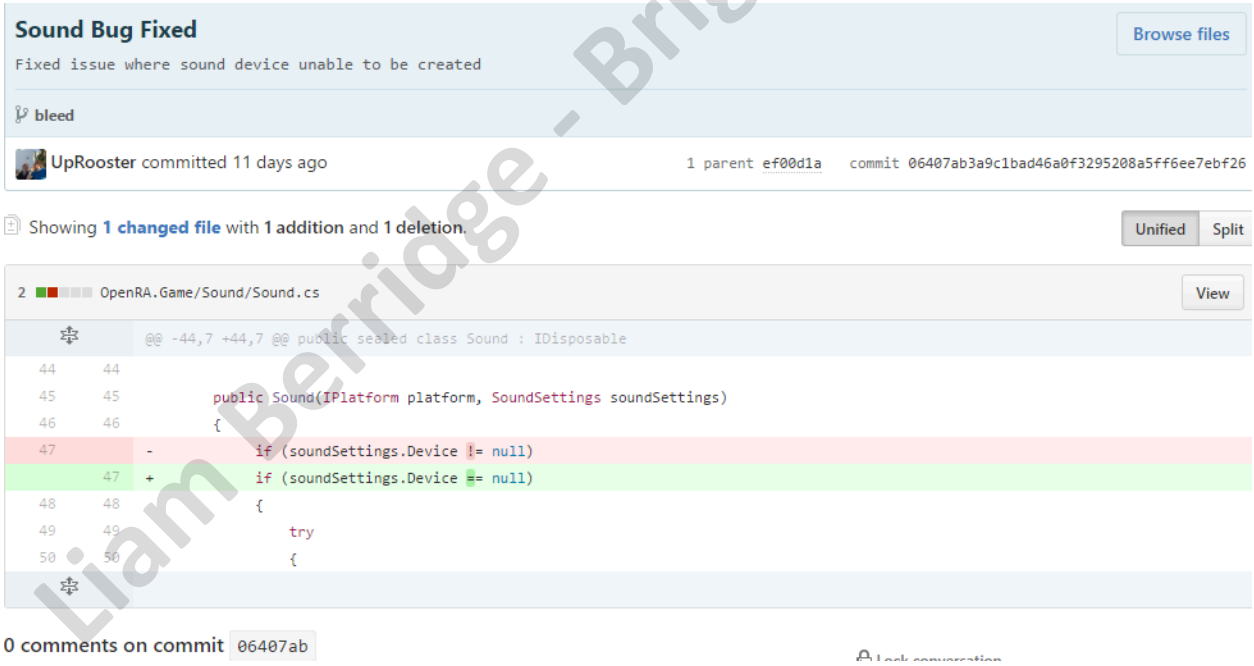
Contributions

Here Liam and Adam were able to reproduce the flamethrower not exploding issue as listed in the backlog, the testing performed would class as white box testing, as both testers were developers also, and were aware of the the underlying structure for the object. Below is evidence of the issue #12233, Flamethrower units not exploding on death, as well as evidence of the GitHub commit and the domain model, showing that the OpenRAGame class was changed.
As shown, a flamer unit is under fire, and the explosion effect is created by the weapon being used against the unit, not by the unit itself.



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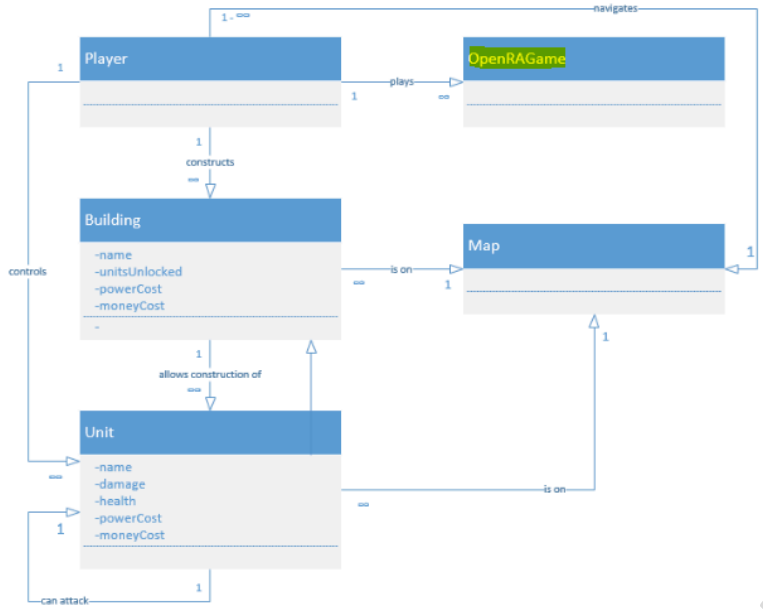

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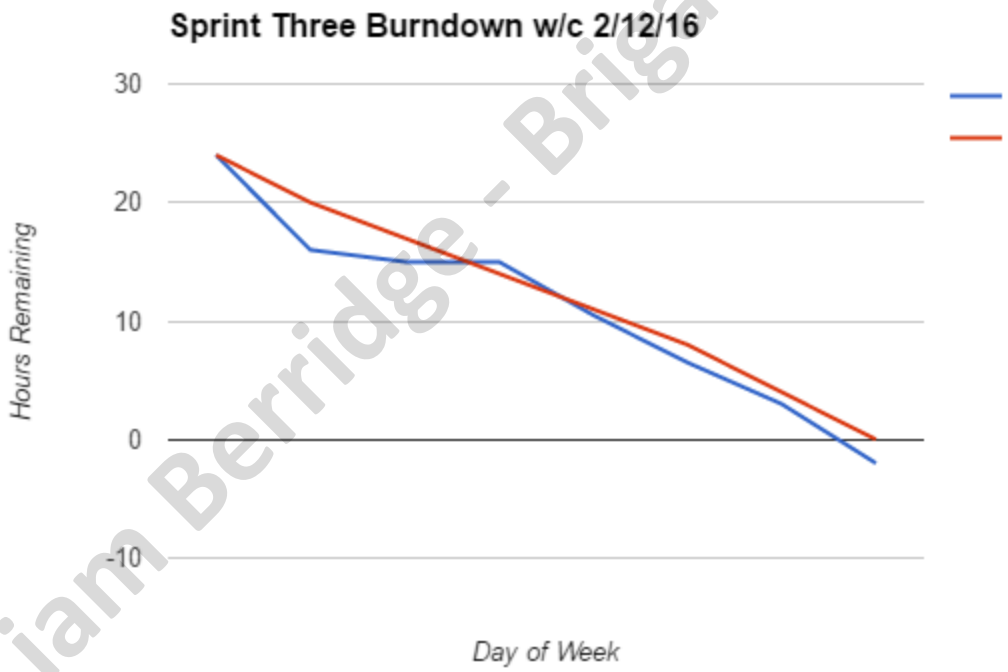
Sprint 3 -

Logs

During the third sprint, Tom Barden and Adam Walker read through the OpenRA Documentation to gain a better understanding of the system as whole, as it was formatted in an unconventional style, and finding specific object definitions became difficult. Tom Robertson and Jake during this sprint were able to reproduce and document the causes of issue #5968, to assist Tom Barden and Adam Walker in attempting to resolve unit pathfinding issues. Liam attempted to resolve issue #12233, and was able to modify existing units properties, but was not able to resolve the issue fully. For this sprint Adam Walker took on the role of SCRUM master, and held the weekly SCRUM. Due to the fact no issues were resolved, no commits were made during the third sprint. This also meant the domain model remained the same. The below burndown was created by Adam Walker as SCRUM master, it shows how the actual burndown for the week closely matched the projected timeline.

Burndown



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Burndown Table

Week Commencing	2/12/16								
Role	Name	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Individual Total
Dev	Tom B	4						2	6
Dev/SM	Adam W	2	1		1	2			6
Dev	Liam B				1	2			3
Test	Tom R				1.5		1.5		3
Test	Jake L				1		2	3	6
	Total Hours	6	1	0	4.5	4	3.5	5	24
	Burndown	16	15	15	10.5	6.5	3	-2	
	Projected	19	16	13	10	7	4	1	

Sprint Backlog

Issue	Time Allocation	Members
#5968 - Units stop pathing if collision	12	Tom Barden, Adam Walker (Pair)
#12233 - Flamethrower units not exploding on death	4	Liam Berridge
Testing #5968 - Units stop pathing if collision	8	Jake Lyons, Tom Robertson

Contributions

During this sprint, no contributions to GitHub or the program were made, however all team members were able to feedback at the weekly SCRUM with knowledge on the given areas, allowing for a deeper understanding of the domain structure and assets.

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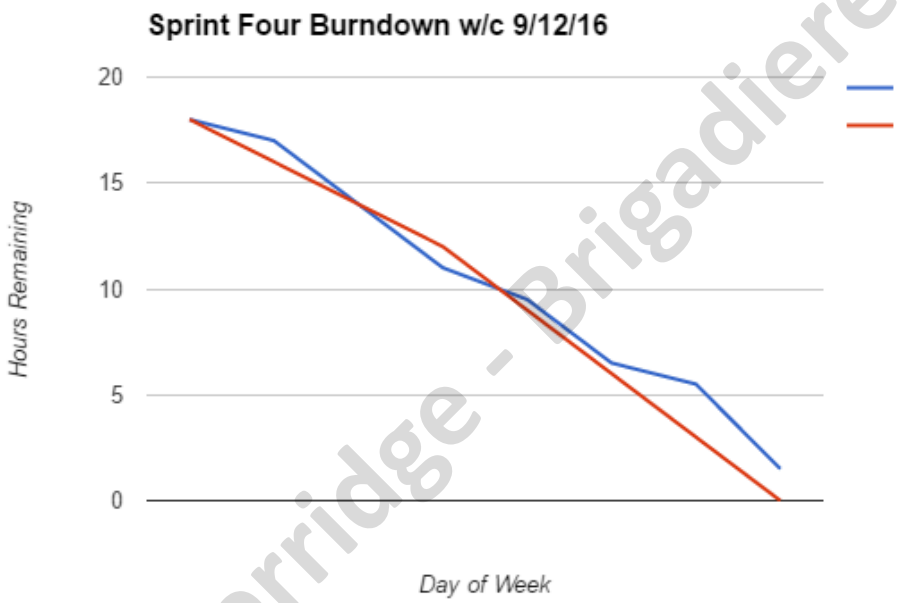
Sprint 4 -

Logs

For the fourth sprint, Tom Robertson took over as SCRUM master and also a tester for issue #11320; Tom Barden and Adam chose to pair program as developers with issue #5968, continuing the work they had started during the previous sprint. Jake Lyons and Liam Berridge also chose to pair program, creating a fix for issue #12233. This fix was later committed and tested. Tom Robertson as SCRUM master created the burndown for this week, along with facilitating the weekly SCRUM. Below is also the updated domain model, showing which area of the game was changed.

Burndown



Burndown Table

Week Commencing	9/12/16								
Role	Name	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Individual Total
Test	Tom B	3				1		1	5
Dev	Adam W					2	1	1	4
Dev	Liam B	2						2	4
Test/SM	Tom R			1	1.5				2.5
Dev	Jake L		3	2					5
	Total Hours	5	3	3	1.5	3	1	4	20.5
	Burndown	17	14	11	9.5	6.5	5.5	1.5	
	Projected	19	16	13	10	7	4	1	

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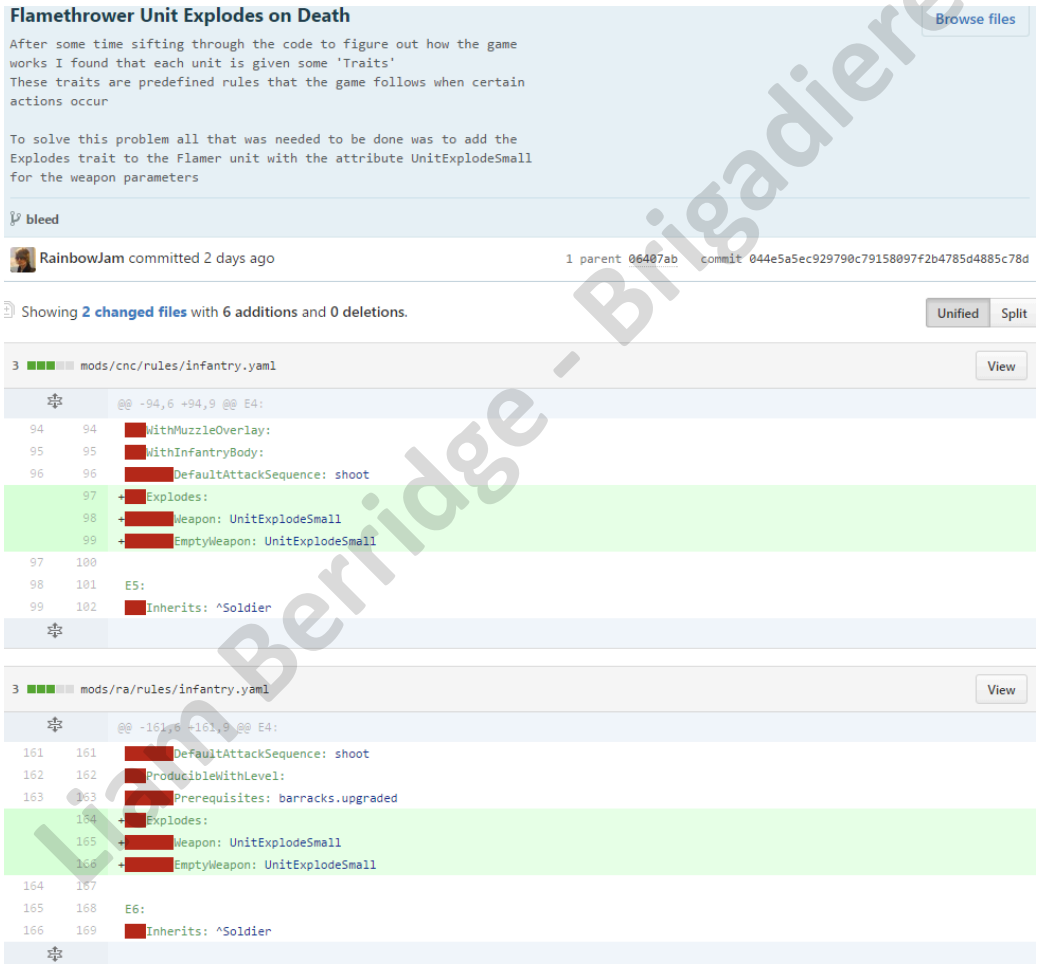
Sprint Backlog

Issue	Time Allocation	Members
#5968 - Units stop pathing if collision	8	Tom Barden, Adam Walker (Pair)
#12233 - Flamethrower units not exploding on death	8	Liam Berridge, Jake Lyons (Pair)
Testing #11320 - Sliding husks don't kill infantry and #12233	2	Tom Robertson

Contributions

For the fourth sprint, Jake Lyons and Liam Berridge pair programmed to create a working fix for flamethrower units, which meant surrounding units were damaged in an explosion when the flamer unit was killed. Below is the commit for this along with some documentation and a pair programming log.



Flamethrower Unit Explodes on Death Browse files

After some time sifting through the code to figure out how the game works I found that each unit is given some 'Traits'
These traits are predefined rules that the game follows when certain actions occur

To solve this problem all that was needed to be done was to add the Explodes trait to the Flamer unit with the attribute UnitExplodeSmall for the weapon parameters

bleed

RainbowJam committed 2 days ago 1 parent 06407ab commit 044e5a5ec929790c79158097f2b4785d4885c78d

Showing 2 changed files with 6 additions and 0 deletions. Unified Split

3 mods/cnc/rules/infantry.yaml View

```
@@ -94,6 +94,9 @@ E4:
    WithMuzzleOverlay:
    WithInfantryBody:
    DefaultAttackSequence: shoot
+   Explodes:
+   Weapon: UnitExplodeSmall
+   EmptyWeapon: UnitExplodeSmall

E5:
    Inherits: ^Soldier
```

3 mods/ra/rules/infantry.yaml View

```
@@ -161,6 +161,9 @@ E4:
    DefaultAttackSequence: shoot
    ProducibleWithLevel:
    Prerequisites: barracks.upgraded
+   Explodes:
+   Weapon: UnitExplodeSmall
+   EmptyWeapon: UnitExplodeSmall

E6:
    Inherits: ^Soldier
```

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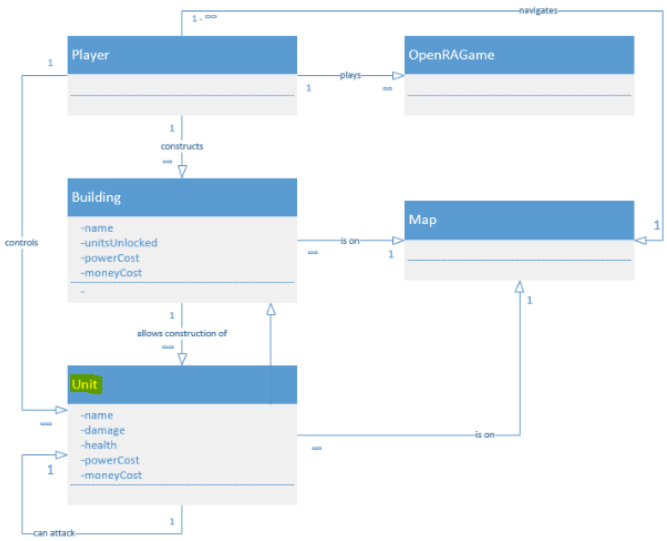

Sprint 5 -

Logs

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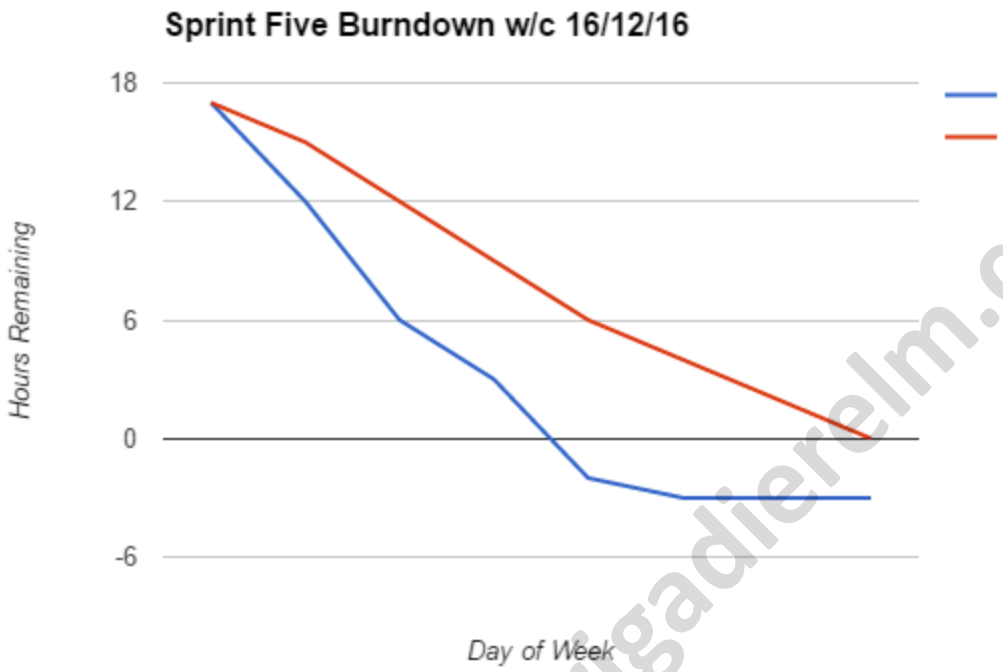
Burndown



Burndown Table

Week Commencing	16/12/16								
Role	Name	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Individual Total
Dev?	Tom B	2			2				4
Test?	Adam W	2		1					3
Test?	Liam B								0
Dev	Tom R								0
Dev/SM	Jake L		4	1					5
	Total Hours	4	4	2	2	0	0	0	12
	Burndown	18	14	12	10	10	10	10	
	Projected	19	16	13	10	7	4	1	

Sprint Backlog

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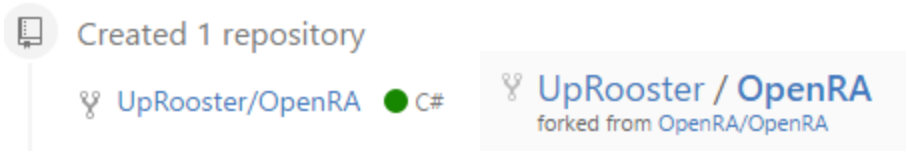
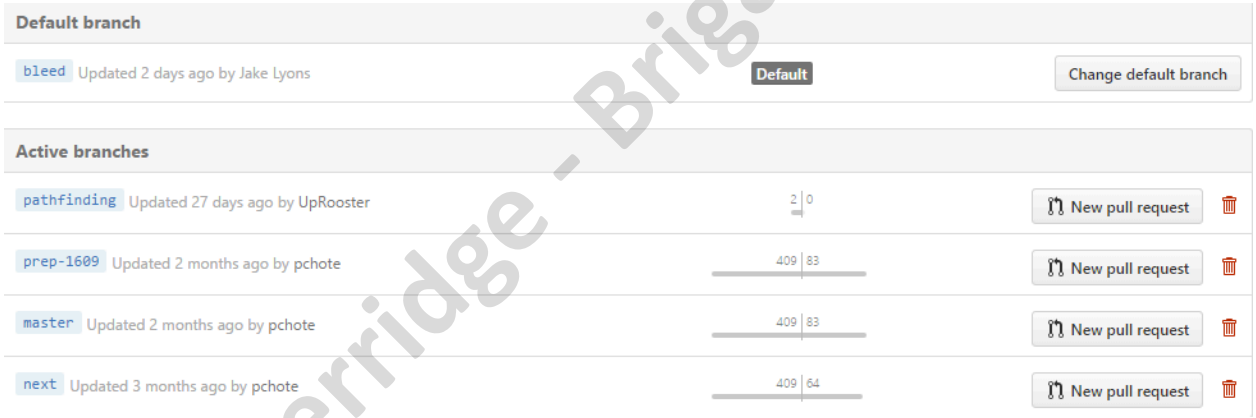
Github

GitHub was the tool chosen for version control over the course of the assignment, and was used to first fork (evidenced below) the original repository for OpenRA, and later to make contributions to it. The below screenshot evidences how the repository was forked, this allows any changes or fixes to be merged back to the original repository if the repository owner approves of the changes.



Next branches were chosen to be committed to, as each branch hosts different changes and fixes. The main branch used was bleed, as this hosts the latest versions of the project, whereas the master branch hosts the last stable release, which is the one currently distributed on the official OpenRA website. During the course of the sprints, the team also added a pathfinding branch, where pathfinding issues could be resolved separately from the default branch. This was done to allow testers to access the latest version without having interference from developments that may not have been finalised.



Finally, all commits made by the team are shown below. The first commit was a paired effort of Liam Berridge and Tom Barden to resolve the audio device error, which appeared to be a third-party software error, as OpenAl which OpenRA relies on did not have error handling for a lack of audio devices. To attempt to resolve this without editing external software, the error logging now asks the user to connect an audio output device. The commit for this is shown below, it details 15 additional lines, and 2 deleted lines which can be seen in green and red. The deleted lines contained simple error handling that gave no output. This was changed to output a sound.log file.

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OpenAL Sound Logging Browse files

Better sound logging with a simple fix added to the debug logs.

bleed

UpRooster committed 25 days ago 1 parent e7e17a0 commit ef00d1ad8bab1e8c1324b205722230ea4be309ad

Showing 1 changed file with 15 additions and 2 deletions. Unified Split

17 OpenRA.Game/Sound/Sound.cs View

```
@@ -44,8 +44,21 @@ public sealed class Sound : IDisposable
        public Sound(IPlatform platform, SoundSettings soundSettings)
        {
-           soundEngine = platform.CreateSound(soundSettings.Device);
-
+           if (soundSettings.Device != null)
+           {
+               try
+               {
+                   soundEngine = platform.CreateSound(soundSettings.Device);
+               }
+               catch (Exception e)
+               {
+                   Log.Write("sound", "No sound device found, connect headphones or speakers:\n{0}", e);
+               }
+           }
+           else
+           {
+               soundSettings.Device = null;
+           }
            if (soundSettings.Mute)
                MuteAudio();
        }
```

The second commit was by Liam Berridge, as the audio fix appeared to cause crashing issues when actually tested. The commit for this is shown below, with 1 addition and 1 deletion, as only a small syntax piece was changed.

Sound Bug Fixed Browse files

Fixed issue where sound device unable to be created

bleed

UpRooster committed 11 days ago 1 parent ef00d1a commit 06407ab3a9c1bad46a0f3295208a5ff6ee7ebf26

Showing 1 changed file with 1 addition and 1 deletion. Unified Split

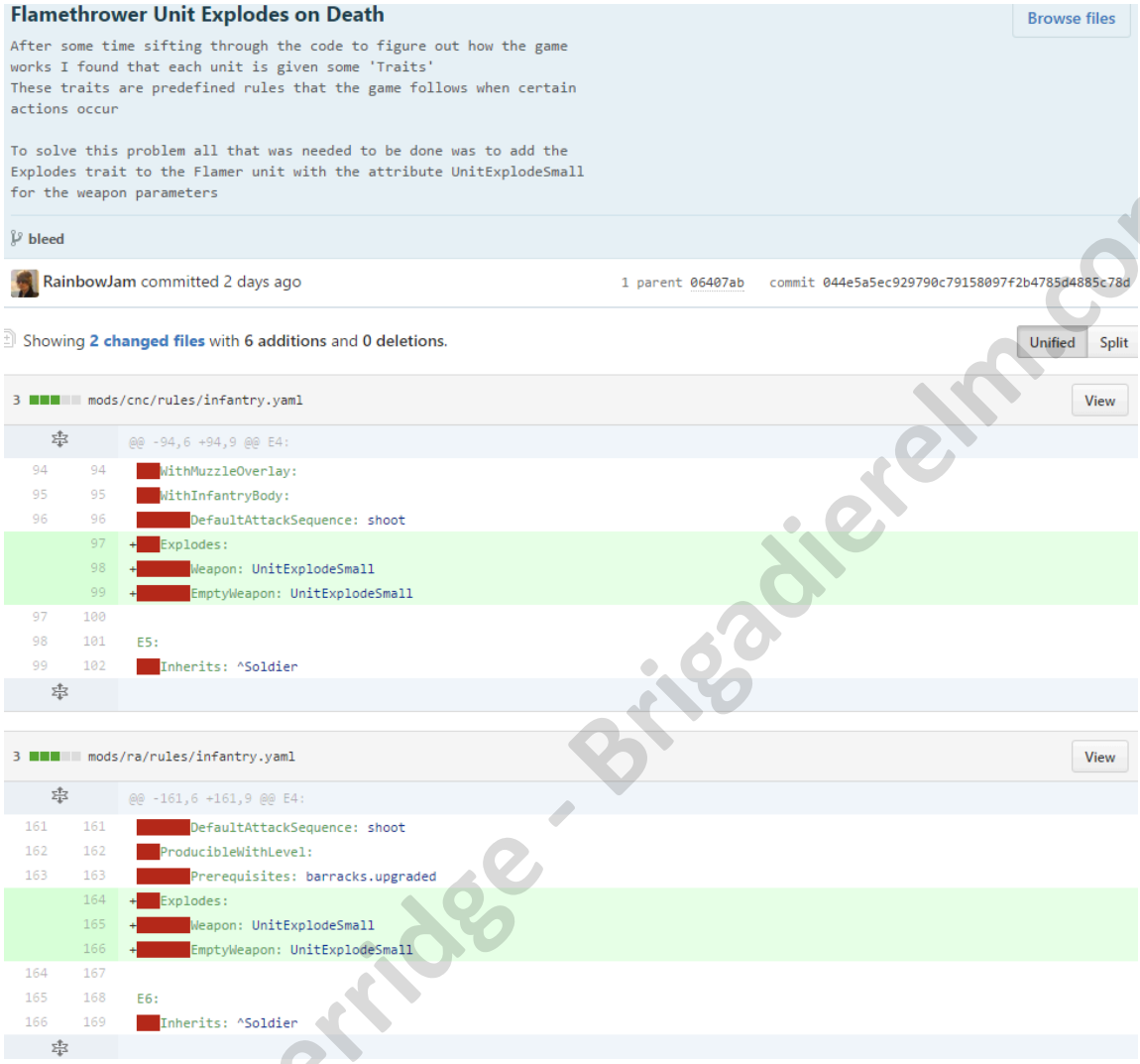
2 OpenRA.Game/Sound/Sound.cs View

```
@@ -44,7 +44,7 @@ public sealed class Sound : IDisposable
        public Sound(IPlatform platform, SoundSettings soundSettings)
        {
-           if (soundSettings.Device != null)
+           if (soundSettings.Device == null)
            {
                try
                {
```

0 comments on commit 06407ab

Liam Berridge - Brigadierelm.com

The final commit was made by Jake Lyons, and addresses the issue where flamethrower units would not explode, a feature present in the original game. In this commit Jake used the traits that pre-existed to make the units explode on death, damaging nearby infantry units.



Flamethrower Unit Explodes on Death

Browse files

```
After some time sifting through the code to figure out how the game
works I found that each unit is given some 'Traits'
These traits are predefined rules that the game follows when certain
actions occur

To solve this problem all that was needed to be done was to add the
Explodes trait to the Flamer unit with the attribute UnitExplodeSmall
for the weapon parameters
```

bleed

RainbowJam committed 2 days ago 1 parent 06407ab commit 044e5a5ec929790c79158097f2b4785d4885c78d

Showing **2 changed files** with **6 additions** and **0 deletions.** Unified | Split

3 mods/cnc/rules/infantry.yaml View

```
@@ -94,6 +94,9 @@ E4:
    WithMuzzleOverlay:
    WithInfantryBody:
    DefaultAttackSequence: shoot
+   Explodes:
+   Weapon: UnitExplodeSmall
+   EmptyWeapon: UnitExplodeSmall

E5:
    Inherits: ^Soldier
```

3 mods/ra/rules/infantry.yaml View

```
@@ -161,6 +161,9 @@ E4:
    DefaultAttackSequence: shoot
    ProducibleWithLevel:
    Prerequisites: barracks.upgraded
+   Explodes:
+   Weapon: UnitExplodeSmall
+   EmptyWeapon: UnitExplodeSmall

E6:
    Inherits: ^Soldier
```

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Critical Reflection

SCRUM and open-sourced projects

SCRUM and role allocation

SCRUM reflection and contributions

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