

## MODULE ASSIGNMENT SPECIFICATION

<b>Student name</b>	Luke Nelson	<b>Student ID number</b>	G20595254
<b>Programme</b>	Choose/Enter your programme of study		
<b>Module</b>	Audio 2	<b>Module level (4, 5, 6)</b>	5
<b>Module code</b>	TE2071	<b>Contribution to overall module assessment (%)</b>	30%
<b>Lecturer</b>	Martyn Shaw	<b>Internal verifier</b>	Jim Ingham
<b>Assignment title</b>	<b>Synthesising Environments</b>	<b>Assignment no. (x of x)</b>	2 of 3
<b>Hand-out date</b>	17 October 2014	<b>Submission deadline(s)</b>	21 November 2014
<b>Formative feedback date</b>	14 November 2014	<b>Grade and summative feedback date</b>	12 December 2014

<b>Referencing</b>	In the main body of your submission you must give credit to authors on whose research your work is based. Append to your submission a reference list (that indicates the books, articles, etc. that you have read or quoted in order to complete this assignment) using the <a href="#">Harvard</a> system.		
<b>Disclosure</b>	<b>I declare that this assignment is all my own work and that I will acknowledge all materials used from the published or unpublished works of other people. All references have been duly cited.</b>		
<b>Student's signature</b>	<i>Assignments without a Turnitin submission will not be accepted without a signature here.</i>	<b>Date</b>	
An electronic version of the assignment is to be submitted through <a href="#">Elearn / Turnitin</a> .		<b>YES</b>	<input checked="" type="checkbox"/>
		<b>NO</b>	<input type="checkbox"/>

<b>Learning Outcome(s) tested</b> (from module descriptor)	<b>Assessment Criteria</b> To achieve each outcome a student must demonstrate the ability to:
<p>4. Evaluate the requirements for synthesising sound in a range of acoustic environments and apply appropriate methods.</p> <p>1. Demonstrate skills in multitrack recording of multiple sources at different times</p> <p>2. Demonstrate skills in mixing multitrack recordings to a given specification.</p> <p>3. Evaluate the need for and operation of typical studio equipment such as compressors, gates and reverb units</p>	<p>Create a simulated piece of audio employing anechoic recordings processed in a logical way.</p> <p>Capture the impulse response of a space for use in the simulation.</p> <p>Record a number of sources in a high quality way.</p> <p>Mix the recorded and processed audio.</p> <p>Apply effects appropriately, particularly reverb.</p>

**This form (ALL PAGES) MUST be inserted at the front of the paper or digital submission.**

## TASK DESCRIPTION

### Part 1

Using Audition, you are to create a 90 second audio piece that tells a story using sound. This must sound like it involves several locations (audibly different) and audible transitions from one to another. It must use the stereo image effectively but also be mono-compatible (still retaining the audible transition).

### Part 2

You need to make a critical comparison of the features, functionality and overall fitness-for-purpose of several different methods of creating reverb on recorded sounds, considering at least two scenarios where reverb may be used. This will involve you doing some research on reverb methods and using the reverb functions in Audition.

## GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

### Part 1

Several sources of sound should be used, including some clean 'anechoic' original microphone recordings made by yourself.

For the reverbs that will be required, you should use at least one impulse response captured by yourself, using the Aurora plug-ins for Audacity (or otherwise). This reverb may be applied using the 'Convolution Reverb...' in Audition. Other reverb methods can be used for different tracks, such as the built-in ones in Audition, or use of impulses downloaded from web sites.

You need to provide a report detailing what you have done, why you did it like that and an evaluation of the results.

The story may be a short journey relating to a particular job. Examples may include:

- Putting out the rubbish
- Buying clothes
- Visiting the hairdressers
- Going to the bar at a rugby match
- Going caving
- Going to the swimming pool
- Going to make a cup of tea but having to nip out for milk
- Running from a class to the bus
- etc

## Submission Requirements

You need to hand in

- All your source sounds, edited sounds, session files and recorded impulses. These will be submitted on FastFolders 2.
- A formal report covering the description of the processes involved, your evaluation of the audio quality and a critical comparison of different reverb methods (see the assessment criteria). This should be about 1600 words, + screen shots. Paper copy in class, electronic submission on Blackboard.

## MARKING CRITERIA

This section details the assessment criteria. The extent to which these are demonstrated by you determines your mark. The marks available for each criterion are shown. Feedback will be provided within 15 working days to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Principles of assessment applied	Weight %	Grade %
<b>Knowledge and understanding</b>		
Description of the processes involved in producing the piece.	<b>20</b>	
<b>Critical analysis</b>		
Critical comparison of reverb methods.	<b>20</b>	
<b>Application to design and synthesis</b>		
Quality of sources recorded and used. Quality of self-recorded impulse. Quality of mixed result.	<b>40</b>	
<b>Evaluation and conclusions</b>		
Your evaluation of the audio quality.	<b>20</b>	
<b>Referencing and supporting evidence</b>		
All sources of information should be clearly referenced.	<b>x</b>	
<b>Oral communication</b>		
Not assessed	<b>x</b>	
<b>Written communication</b>		
Not assessed, but the written work should be in the form of a formal report, see <a href="http://media.uclan.ac.uk/report_writing_guide.pdf">http://media.uclan.ac.uk/report_writing_guide.pdf</a>	<b>x</b>	
<b>Group work</b>		
Not assessed	<b>x</b>	
<b>TOTALS</b>		
	<b>100</b>	

# PRINCIPLES OF ASSESSMENT

Class	Knowledge and Understanding	Critical Analysis	Application to synthesis / design	Evaluation and Conclusions	Referencing / Supporting evidence	Oral Communication	Written Communication	Group Work
Class 1 (Excellent) 80-100	Clear demonstration of an intuitive understanding of the subject matter encompassing a broader spectrum than taught material.	Succinct, well explained and intuitive analysis, showing a broad and deep knowledge of the subject area.	Full and inventive response, innovative and diverse. Fully realized.	Independent evaluation of material covered demonstrating familiarity with the work of others. Clear conclusions with awareness of the limitations of theory and practice within a body of work.	Exceptional quality and amount drawn from all relevant areas. Well argued and constructed literature survey which is both up to date and contains sufficient historical detail.	Purposeful and expansive. Captivating narrative style, illuminating and intriguing content, balanced and comfortable structure. Visual aids used wisely.	Publishable in a peer reviewed journal with little or no modification.	A flair shown for working with others. Able to take a variety of roles within a group with full awareness or the roles and limitations of others. Communication / collaboration that enables others within the group.
Class 1 (Outstanding) 70-79.99	Accurate factual content and clear thorough understanding shown of taught and additional material. Clear development of own ideas.	A very good analysis of the evidence / problem / arguments or other material under consideration. Arguments logical and structured	Very successful application of theory / knowledge to new situations. Demonstrable competence in practical / theoretical investigations.	Distinctive work, showing independent thought and ability to place a personal value judgment on a range of statements / reports. Clear and illuminating conclusions.	Excellent use of references / supporting evidence from various sources. Evidence supports the analysis and evaluation. Awareness of the limitations of existing data, theories or models.	Voice clear, well paced, confident. Outline and content very clear, relevant and informative. Narrative well structured. Visual aids very well produced and appropriate.	Excellent: almost no spelling or presentation errors. Appropriate choice of words. Good sentence / paragraph construction. Very clearly presented. Correct scientific conventions used.	Well organised management and performance of tasks. Clear delineation of roles. Excellent communication and collaboration
Class 2:1 (Above ave) 60-69.99	Accurate factual content and good understanding of most taught material. Some development of ideas.	Good analysis, well ordered and clearly presented	Generally sound application of theory / knowledge. Evidence of competence in practical / theoretical investigations.	Evidence of independent thinking and / or logical argument, with some value judgment, and some logical conclusions.	Good use of referencing supporting the content and providing insight. Some awareness of the limitations.	Voice and delivery good. Content well set out. Narrative generally well structured. Good use of visual aids.	Very good: almost no errors of spelling. Good structure / construction, neatly presented. Readable style.	Evidence of management and performance of tasks. Some delineation of tasks. Good communication and collaboration.
Class 2:2 (Below ave) 50-59.99	Adequate factual content and understanding of most taught material. Some limitations apparent.	Some analytical treatment but may be prone to description, or too narrative, and lacking clear analytical purpose.	Limited application of theory / knowledge with some inaccuracies in work.	Development of some independent thinking. Personal views indicated in broad terms. Limited evaluation. Conclusions limited.	Some use of referencing.	Voice and delivery acceptable. Content coherent. Narrative lacking some structure. Visual aids acceptable.	Acceptable: some errors in spelling and syntax. Correct structure, style difficult to follow in places.	Some evidence of responsibility for management and performance of task. Reasonable communication and collaboration.
Class 3 (well below ave) 40-49.99	Basic recall and limited understanding of a limited range of material.	Largely descriptive or narrative, with little evidence of analytical skill.	Little evidence of application.	Standard view rather than independent view presented. Little evidence of independent thinking. Few valid or relevant conclusions.	Basic use of referencing.	Voice and delivery barely adequate. Narrative poorly structured. Content lacking relevance.	Poor: many errors in spelling and syntax. Poor structure, difficult to follow.	Poor communication with others in the group. Little attempt at organization.
Recoverable Fail 30 - 39.99	Significant gaps / omissions in knowledge. Little evidence of understanding.	Descriptive and / or paraphrased with some inaccuracies.	Insufficient evidence of application.	Significantly flawed evaluation. Some inappropriate conclusions.	Inadequate or irrelevant use of referencing.	Voice and delivery unclear. Narrative unstructured. Content inaccurate.	Poor spelling and syntax. Poor structure, untidy presentation.	Little evidence of communication. Inadequate organization.
Irrecoverable Fail 0-29.99	Lack of basic knowledge necessary. No evidence of understanding	Lack of valid analysis.	Virtually no evidence of meaningful application.	No independent evaluation or conclusions.	No use of referencing.	Incomprehensible. No real factual content.	Incomprehensible. No discernible structure or meaning.	Lack of communication with others. No evidence of working as a group. Disruptive. Freeloader.

# STUDENT SELF EVALUATION FORM

<b>Student name</b>	Luke Nelson	<b>Student number</b>	G20595254
<b>Programme</b>		<b>Year of programme</b>	
<b>Assignment title</b>	Synthesising Environments		



This section repeats in brief the principles of assessment detailed on previous pages. The extent to which these are demonstrated by you determines your mark. Using these criteria, tick the box that best indicates the level of achievement you feel you have achieved with regard to each of them.

Common Assessment Criteria Applied	Level of Achievement						
	REFER		3rd	2:2	2:1	1st	1st
	IRRECOVERABLE FAIL	RECOVERABLE FAIL	WELL BELOW AVERAGE	BELOW AVERAGE	ABOVE AVERAGE	OUTSTANDING	EXCELLENT
Knowledge and understanding	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Critical analysis	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Application to design and synthesis	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Evaluation and conclusions	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Referencing and supporting evidence	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Oral communication	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Written communication	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>
Group work	0-29% <input type="checkbox"/>	30-39% <input type="checkbox"/>	40-49% <input type="checkbox"/>	50-59% <input type="checkbox"/>	60-69% <input type="checkbox"/>	70-79% <input type="checkbox"/>	80-100% <input type="checkbox"/>

PLEASE COMMENT ON AREAS IN WHICH YOU FEEL THAT YOU HAVE PERFORMED WELL	PLEASE COMMENT ON AREAS YOU FEEL THAT YOU NEED TO DEVELOP
Click here to enter text.	Click here to enter text.

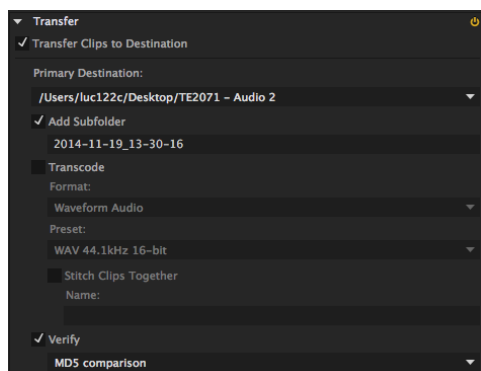
# Recording the Speech

To record my speech, I used a RODE VideoMic GO, a hypercardioid dynamic microphone with a suspension mount. This was plugged into my Panasonic Video Camera. This records to SD card meaning there is no noise from a cassette deck. I monitored the audio using my Audio-Technica ATH-M50x headphones. This setup in an acoustically dead environment provides a clean recording with very little noise. I could have used a Zoom/Marantz with a better microphone, however, my rig is easier to setup and provides just as good results. However, due to the limited frequency response, it would not be suitable for recoding the impulses.

VideoMic GO Specifications	
Acoustic Principle	Line Gradient
Active Electronics	JFET impedance converter with bipolar output buffer
Capsule	0.50"
Polar Pattern	
Address Type	End
Frequency Range	100Hz - 16kHz(selected HPF @0)
Maximum SPL	120dB SPL(@ 1kHz, 1% THD into 1KΩ load)
Sensitivity	-35.0dB re 1 Volt/Pascal (17.80mV @ 94 dB SPL) +/- 2 dB @ 1kHz
Equivalent Noise Level (A-weighted)	34dB-A
Weight	73.00gm
Dimensions	79.00mmH x 73.00mmW x 167.00mmD
Output	
Warranty	1 year with free extension to 2 years following registration <a href="#">here</a>

The RODE VideoMic GO's Specifications. It has a hypercardioid polar pattern meaning it picks up less of the reverb from the sides and behind and more of the direct sound from the front. It also has a limited frequency response, 100Hz - 16kHz. This means it is less susceptible to any bass frequencies and any higher pitched frequencies. This is good for recording my vocal speech as it limits to the vocal range, but not quite as harsh at the 3kHz telephone band.

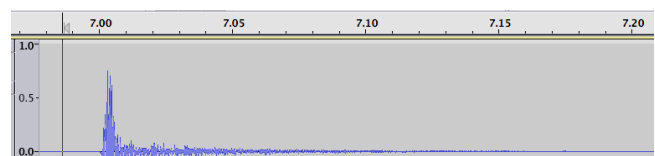
I decided to take multiple recordings of each line, each done by a different person. I could then decide who was the best voice for each character. After I had recorded all the speech, I ingested it with Adobe Prelude. This transcoded the footage to audio-only and kept the metadata for audition. It also created sub-folders to help me manage my media.



I transcoded the footage to WAV 16-bit 44.1kHz.



The setup of my equipment. I placed the camera on a tripod to limit any handling noise.

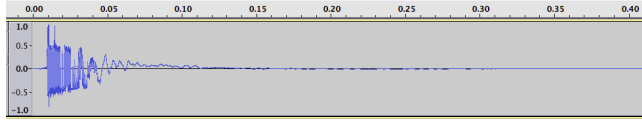


I took an impulse response of my recording space and found that the initial impulse dies away quite quickly (0.01 of a second) and the reverberations last only 0.12 of a second.

# Impulses

## Recorded Impulses

The impulses in the car and small room were recorded using an unattenuated AKG C414B into a Marantz PMD661. For the impulse for the car, the microphone was set to omni-directional mode and held in the centre of the car by its shock mount. I struggled to get a non-clipped version of the car impulse as it was just too loud in the enclosed space.



As you can see from the waveform, it was over very quickly. The air pressure struggled to compress in such a confined airtight space produced a very strange waveform.

For the Room impulse, I placed the microphone on a microphone stand and set it to omnidirectional mode. This created a reasonable impulse on the first try but I took a couple more for good measure.

## Audition's Built-in Impulses

For the train station, I used the 'Endless Tunnel' effect as this sounded closest to my memory of a train station.

## Internet Impulses

The impulses in the

## Mixing

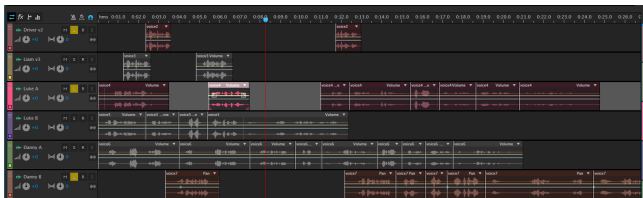
I decided to mix in Audition's multitrack mode. This is how I did it:

Name	Status	Duration
all at once.wav		0:2
Synthes...ustic Environments.sesx		1:2
voice1.wav		0:2
voice2.wav		0:0
voice3.wav		0:0
voice4.wav		0:1
voice5.wav		0:1
voice6.wav		0:2
voice7.wav		0:1

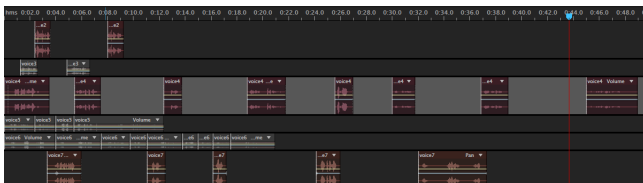
First, I imported all the speech WAV files into Audition. I had to create a multitrack session. I chose the same settings as the WAV files, 44.1kHz sample rate and 16-bit.

I then played out all of the voice tracks on individual layers and named them. I went into each clip, normalised it to -0.5dB. I also deleted the noise at the start and end and any long places of silence. Then I added markers to help me find what speech was where.

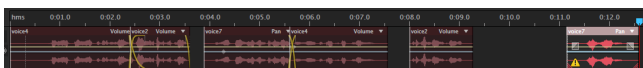
Name	Start
I'm driving as fast...	0:00.030
it's just round this...	0:01.384



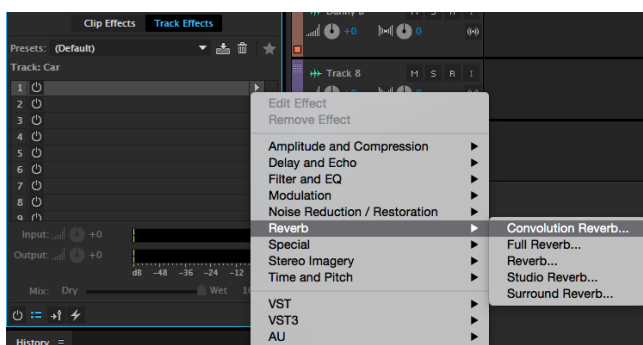
Then, I split the clips using the razor tool and began to move them into the correct place. I listened to the conversation in each character combination and decided which was best. I then muted the tracks that contained the speech I would not be using. I also picked the best version of any sentences that were recorded more than once and deleted the clips I would not be using.



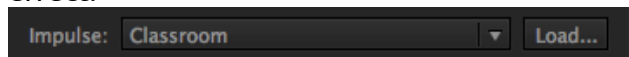
Now that I had my speech in the right order, it was time to begin adding reverb. First, the car; I pulled all of the clips taking place in the car onto one track and renamed the track 'Car'.



Once I had done that, I could now non-destructively add one reverb effect to the whole track instead of having to go into the waveform editor and apply destructive effects one at a time.

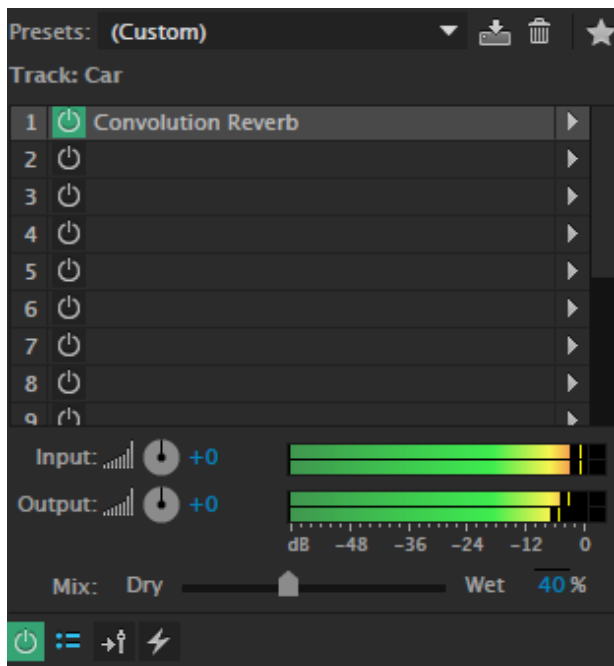


I made sure that the 'Car' track had been selected and went for the convolution reverb effect.

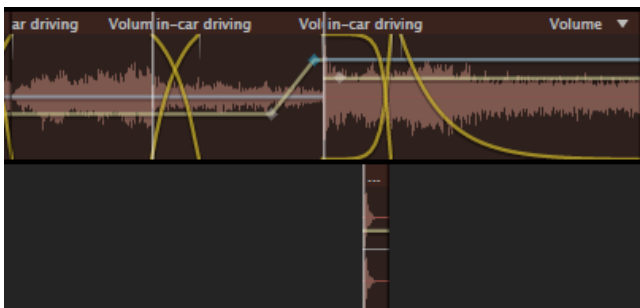


I then chose the 'Load...' button which allowed me to select my best car impulse response and use that for the convolving process.

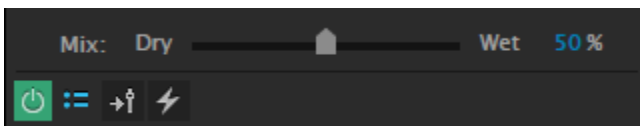




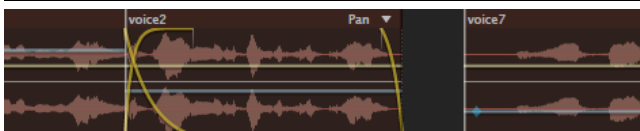
When the impulse had been processed, it automatically set it to 100% wet signal. This is unrealistic as you always hear some of the dry signal unless you are past the critical distance (which is unlikely if you are in a car). I adjusted the wet/dry ratio until it sounded more realistic. This turned out to be about 40%. I clicked the green power button to toggle the effect on and off; I listened to it with and without the effect. I concluded that with the effect, it did indeed sound more like a conversation inside a car.



I then added a new track called <sup>8</sup>Car Ambience<sup>9</sup>. These tracks include sounds you would likely hear inside a car. I also added a sound effects layer for things like the car door closing.



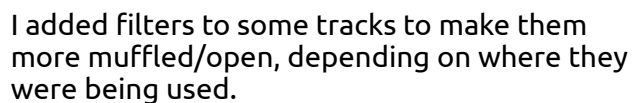
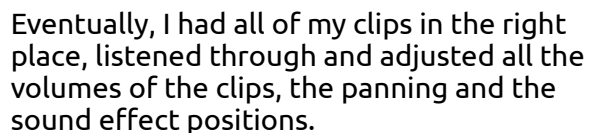
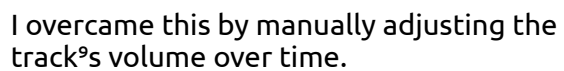
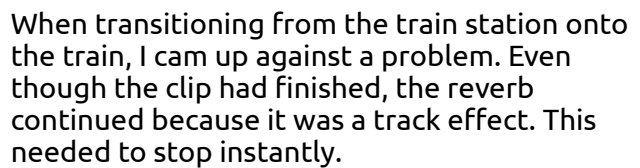
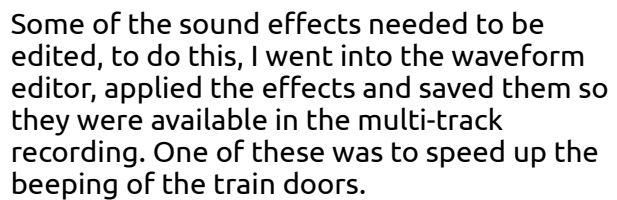
The ambience layer also needed the convolution reverb but at a different Wet/Dry mix, 50% seemed to sound best.



Next I panned the speech and sound effects to help recreate a believable stereo soundscape.



I then created more tracks for Outside, Outside Ambiance, Outside SFX, Station, Station Ambiance, Station SFX, Train, Train Ambiance and Train SFX.



pop the balloon. Deepening on the reverb time of the environment, it can be over very quickly. This is also more acceptable in a public place than playing the swept tone but startles more than the hand clap.

### **AURORA**

The Aurora Conceiver plugin for Audacity does a great job at synthesising environments. However, for the setup required and the time it takes, the balloon is a better option. Not only do you have to take time to setup, you also have to get about 30 seconds of no background noise while the swept tone is played.

## **Built-in Impulse Responses**

The built in impulse responses are good but take a lot of tweaking. They are a very generic 'one sound suits all' idea, meaning that you need to get it right for you. Luckily, the controls are easy to understand. It just takes a lot of time to master but the results are very good. I think though that it is better to get your own impulse of the actual space rather than bending one to suit you.

## **Internet Impulses Responses**

The Open AIR Library is a fantastic resource. It contains many impulse responses and most are licensed for use under Creative Commons. I used one of their impulses and it worked brilliantly, it sounded just like the sample audio. As the library grows, it is easier to find an impulse from the internet.

## **Evaluation**

I think I have done a good job at recreating my story, a rush for the train. I have used several reverb methods successfully and enhanced them by using other features such as filters and panning. I have tried to keep the quality of my audio to the highest level, only entering a minimal amount of noise.

## **Links to Resources**

### **IN CAR DRIVING**

Credit to RutgerMuller.

<https://www.freesound.org/people/RutgerMuller/sounds/50910/>

Licensed under the CC0 (Creative Commons 0 Public Use Licence)

### **CAR DOOR**

Credit to phenoxy

<https://www.freesound.org/people/phenoxy/sounds/195450/>

Licensed under the CC Attribution licence

### **RUNNING**

Credit to avakas

<https://www.freesound.org/people/avakas/sounds/144121/>

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### **METRO STATION WALLA**

Credit to matucha

<https://www.freesound.org/people/matucha/sounds/189874/>

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### **PUNCH PRESS**

Credit to dnewtonjr

<https://www.freesound.org/people/dnewtonjr/sounds/232598/>

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### **PRINTER**

Credit to toiletrolltube

<https://www.freesound.org/people/toiletrolltube/sounds/182893/>

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**SLIDING DOOR**

Credit to tompallant

<https://www.freesound.org/people/tompallant/sounds/208721/>

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**ROOM TONE**

Credit to filmfan87

<https://www.freesound.org/people/filmfan87/sounds/108400/>

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**FOOTSTEPS**

Credit to ddohler

<https://www.freesound.org/people/ddohler/sounds/34256/>

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**TRAIN STATION IMPULSE**

<http://www.openairlib.net/auralizationdb/content/terrrys-factory-warehouse>

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