B2M31SYN - Semestral project

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Introduction

This semestral project consists of three tasks. First task is to implement synthesis of musical instruments for one of the given compositions using MIDI files. Second task is to implement three octaves of major scale for each implemented musical instrument and third task is any implementation of audio synthesis to create for example an ordinary sound.

Task 1

I have chosen song called 'Take on me' by music band 'A-ha'. This song is played by eight musical instruments. Acoustic Grand Piano was implemented using additive synthesis as well as Orchestral Harp and Flute. Acoustic Nylon Guitar was created using modified Karplus–Strong algorithm. Plucked Electric Bass was implemented using filter synthesis. As a source signal for Plucked Electric Bass is used sawtooth wave.

Violin, Oboe and Clarinet were created using formant synthesis. A source signal for Violin is sawtooth wave, source signal for Oboe is narrow periodic pulses and as a source signal for Clarinet is used square wave.

All methos are taken from lectures and seminars of B2M31SYN course.

Task 2

For all used musical instruments are implemented three octaves of major scale in their frequency range. Frequencies of the lowest and the highest tones of the scale for each instrument are shown in the table 1.

Instrument	f_{min}[Hz]	f_{max}[Hz]
Acoustic Grand Piano	130.813	1046.502
Acoustic Nylon Guitar	130.813	1046.502
Plucked Electric Bass	32.703	261.626
Violin	261.626	2093.005
Orchestral Harp	130.813	1046.502
Oboe	261.626	2093.005
Clarinet	195.998	1567,982
Flute	130.813	1046.502

Table 1: Major scale for each instrument

Task 3

I have chosen extraordinary sound called 'flight combat' for the third task of the semestral project. It is fight between a propeller plane and a chopper.

The first part of the sound is start of a propeller plane. It flies away and then it goes back. In the second part of the sound a chopper appears and starts firing missiles at the plane. In the last part of the sound the plane strikes back with a machine gun, the chopper is hit and starts falling. Alarm is warning and the chopper explodes.

All sounds except for alarm are implemented using filter synthesis.