## **DOCUMENTATION**

For the part 2 of the assignment, I have tried to create a square wave with varying amplitude, similar to that of a sinusoidal wave.

So the code contains few smaller snippets which work together to give the square wave with sinusoidal envelope.

**level\_1, level\_2, level\_3, level\_4:**

this code part deals with the generating of constant signal where the value of the constant   
amplitude is change after every constant level signal generation.

**Increment1:**

This part deals with increasing the level of the constant signal after each constant level   
generation. The value of each constant level is increased as long as it does not reached the upper bound of the upper half specified in register r6. Once the level of value specified in r6 is reached, label decrement1 starts functioning

**Decrement1:**

This part deals with decreasing the level of the constant signal after each constant level   
generation. The value of each constant level is decreased as long as it does not reached the lower bound of the upper half i.e. 0. Once the level of value 0 is reached, work of decrement1 is done and label increment2 starts functioning

**Increment2:**

This part deals with increasing the level of the constant signal after each constant level  
generation in negative direction. The value of each constant level is decreased as long as it does not reached the lower bound of the lower half as specified in register r5. Once the level of value as specified in r5 is reached, work of increment2 is over and label decrement2 starts functioning

**Decrement2:**

This part deals with increasing the level of the constant signal after each constant level   
generation. The value of each constant level is increased as long as it does not reached the upper bound of the lower half i.e. 0. Once the level of value 0 is reached, work of label decrement1 is done and the entire operation is repeated all over again.

So in the main loop the increment1 and decrement1 functions 1st creating the complete upper half of the sinusoidal envelope for the square wave, while the increment2 and decrement2 loops are responsible for creating the complete lower half of the sinusoidal envelope for the square wave.

Thus the 4 loops with the inner loop for constructing level/constant signal of particular amplitude  
is responsible for creating an entire time period of sinusoidal wave. This keeps on repeating for indefinite time.

Main Loop:

First Half:

Increment1:

Level:

Creation of level order/constant signal by creating the sound sample   
 of particular amplitude over a fixed repetition

Increment the value of constant level  
 If the constant level value has not reached maximum, loop to increment1

Decrement1:

Level:

Creation of level order/constant signal by creating the sound sample   
 of particular amplitude over a fixed repetition

Decrement the value of constant level  
 If the constant level value has not reached 0, loop to decrement1

Next half:

Increment2:

Level:

Creation of level order/constant signal by creating the sound sample   
 of particular amplitude over a fixed repetition

Decrement the value of constant level  
 If the constant level value has not reached minimum, loop to increment2

Decrement2:

Level:

Creation of level order/constant signal by creating the sound sample   
 of particular amplitude over a fixed repetition

Decrement the value of constant level  
 If the constant level value has not reached 0, loop to decrement2

Continue to “Main Loop”