Final Project

Mahdi Moghassemi

Your task is to enhance Homework 4 using the x86 SIMD instructions. Implement a function named **merge_frames_simd** in a file called **merge_simd.asm**. This function performs the same operation as the **merge_frames_asm** function in Homework 4, but it must utilize SSE2 or AVX instructions to merge the two video arrays. Useful links about SSE2/AVX instructions can be found at the end of this document. Do not make changes to the files **main.c**, and **merge.c**.

By only doing the above in 32-bit, you will get 70 percent of the total score. To get the full score you need to do all the above both in 32-bit and 64-bit modes (each in a separate folder).

During the presentation, you will demonstrate your work to the TAs, who may evaluate your understanding of the project by testing your code with various inputs and asking you questions about different parts of the code. Additional information about the deadline and project submission will be provided on the Telegram channel.

Extra credit:

1. Put the entire project in a single folder instead of two separate folders. The user must have the option to build either a 32-bit or 64-bit program. To achieve this you must utilize CMake. The user should be able to set 32-bit or 64-bit output as a **CMake option**. CMake will generate the appropriate Makefile for each option. (15% extra)
2. Configure the code and CMake settings to automatically detect the operating system and generate the correct Makefile accordingly. By

implementing this feature, your project will be capable of compiling and running under both Linux and Windows operating systems. (15% extra)

More about SIMD/SSE2/AVX:

- SSE2 SIMD integer instructions - Wikipedia
- https://docs.oracle.com/cd/E18752_01/html/817-5477/epmpv.html#ep tyd
- http://sci.tuomastonteri.fi/programming/sse
- https://www.youtube.com/playlist?list=PL0C5C980A28FEE68D