CSI 370 Computer Architecture - Research 1
Morse Code Translator and Telegrapher

Luke Cutter
Champlain College

What?
This project involves creating a morse code translator that takes an input and returns a morse.txt file with the correct Morse Code. The project also outputs tones in the pattern of the Morse Code, giving an extra layer of authenticity and challenge.

Why?
Morse Code is an almost two hundred year old piece of technological genius that revolutionized the way humans contacted each other with important information. By implementing Morse code in MASM assembly, this project will demonstrate an understnading of:

- ◇ Low-level programming concepts and hardware interaction
- ◇ Memory management in constrained environments
- ◇ CPU timing and optimization techniques
- ◇ Register preservation and proper reservation of shadow space for API calls

How?
The development process will follow these major phases:

- ◇ Initial research into Morse Code and how to properly translate it.
- ◇ Implementation of a lookup table for characters in Morse Code
- ◇ Usage of Windows API calls such as Beep to create the tones for Morse Code
- ◇ Testing and optimization for hardware

Development will be tracked through these milestones to ensure project completion. Each phase will involve documentation of processes and challenges encountered, building toward the final technical report.

Challenges?
Major challenges this project will address include:

- ◇ Bringing together all of my knowledge learned during the semester to work on this difficult project
- ◇ Managing limited system buffer sizes and ensuring no spillover
- ◇ Managing shadow space for API calls
- ◇ Efficiently clearing the stack using pop and push

Solutions?
To address these challenges, the project will:

- ◇ Utilize existing documentation and community resources for learning
- ◇ Plan memory usage and data structures before implementation
- ◇ Start with basic features and incrementally add complexity

- ◇ Use Stack Overflow to see where common issues lie to avoid the pitfalls

Explanations and Visualizations
The technical report will include:

- ◇ Morse Code Alphabet mapped to a lookup table
- ◇ Input locations
- ◇ Outputted Morse code translated back into text
- ◇ Youtube Video showing operation

Sources

- ◇ http://www.moratech.com/aviation/morsecode.html
- ◇ https://learn.microsoft.com/en-us/windows/win32/apiindex/windows-api-list
- ◇ https://stackoverflow.com/questions/20569984/windows-api-beep-function-in-nasm-assembly
- ◇ https://morsecode.world/international/translator.html