# Midway Checkpoint for Project

## Team Members:

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## Project Topic: ARM Simulator (Project 1)

## Methodology/Project Plan:

The main task is decoding the hex instruction that is provided as the input. For that we have to study the structure of the binary instruction and figure out which parts correspond to what part of an ARM instruction.

Along with the binary structure, we have to know the various flags set by each instruction. In ARM, there are 4 flags and every instruction can set some flags based on the result of the computation. Further, each instruction can be conditionally executed based on the current values of the 4 flags.

After studying the structure, the next task is to compile a list of functions that we have to implement in this project, and figure out how they look in binary.

Once the list is compiled and we know the structure of binary code, we start implementing the function simulator in C++.

In the code, these are the main functions:

1. Fetch: Fetches the instruction from main memory and updates the Program Counter.
2. Decode: This is the most important functionality. It decodes the hex code to figure out what exactly we need to do, and sets global variables to tell the later functions what they need to do. This is mostly done by if-else blocks on the binary of the instruction.
3. Execute: Depending upon the decoding of the hex code, this function simulates the ALU task that is to be performed
4. Mem: Does all the interaction with data memory.
5. Write back: Writes the final result, back into destination register after the execution stage.

# Timeline:

15$^{th}$ -17$^{th}$ October: Read about the binary structure of instructions in ARM, and which bits correspond to what.

18$^{th}$ -19$^{th}$ October: Compiled a list of all arm functionalities covered in class and their respective binary/hex codes.

21$^{st}$ -22$^{nd}$ October: Started and finished implementing the ARM simulator in C++.

23rd October: Tested the simulator on various samples, including the two listed in the design document.

24$^{th}$ -29$^{th}$ October: Update the README and design document, provide extensive documentation of the code.