<u>Project report</u>

<u>Used data structures and algorithms:</u>
In our project, we used a few data structures and algorithms to help us complete the code. The first data structure we used was a hashmap to organize the components, stimulus input, and circuit flow. We have also used a breadth-first search to evaluate the boolean expression we will write out to our simulation files. The get_stimulus() function works by reading the file containing the stimuli and storing all the stimuli in an array by order. The get_component() works by reading the library file and storing the components in a hashmap from the component name to the component. The get_circuit() function works similarly to the get_component() function, except that it reads the circuit components with their inputs and outputs. The evaluate_expression() function loops over the boolean expression for the gate to evaluate the bitwise operation. The simulate() function loops over the stimuli checking the inputs that changed values and then checks the circuit for the changed values to change the needed outputs.

<u>Testing:</u>
We have tested our code by having our code output a simulation file, which stores the input stimulus and how that will affect the outputs of the circuit. We then compare that output with the initial time diagram that we made at the beginning of the project.

<u>Challenges:</u>
The biggest challenge that we faced during this project was how are we going to model everything in the code. We went into the project not knowing what the best way to model our data flow was. However, when we started working on the code we realized that we organize the components and how they are connected in the circuits using hashmaps. Our second challenge is how we will make the coding process the data we have made read from our files and output the simulation. Nevertheless, we soon knew we should model our stimulus inputs as an ordered array and loop over the array scanning the circuit to see which outputs would change at what time.

<u>Contributions:</u>

Seif: Test Circuits 1, 2,3, simulate function, evaluate expression function, get circuit component function, evaluate and propagate function, structs for component, circuit component, and stimuli.
Adham: Test circuits 4, and 5, get components function, get stimuli function, time graph diagrams, simulate function.