ESE 549
Project1 – Report:

PART1:

1. Gate * gate_obj; //gate_obj is the pointer variable.
2. (gate_obj→gateTypeName() = = “NAND”) ? return true : return false;
3. (gate_obj→getvalue() == “LOGIC_ONE”) ? return true : return false;
4. When a gate’s value is ‘U’ it means the gate’s value is not determined yet.
5. vector<Gate *> gateVectorObjects;
6. vector<Gate *> myPIGates = myCircuit→getPIGates();
7. vector<Gate *> myPOGates = myCircuit→getPOGates();
8. Controlling value is one of the inputs that changes the output logic when it is changed independent of the other input.

For an OR gate, when one of the inputs is ‘1’, the output logic is always one and it doesn’t depend on other inputs. The controlling input for OR gate is ‘1’.

For an XOR gate there is no controlling input.

PART 2 and 3:

I defined functionality of logic gates depending on the 3 valued and 5 valued logic. The outputs of the gates depend on the following:

- The output first depends on the controlling input.
- Then the output is ‘X’ if there is an ‘X’ in the input end. ‘X’ represents unknown value.

- The output depends on ‘D’ or ‘B’ which take precedence after checking for ‘X’.
- If none of the above case is met, the gate performs its trivial functionality of outputting a 0 or 1 depending on the inputs(which now contain only 0 or 1).

Used Recursion to get all the gate values:

- The recursive call begins when vector of output gate pointers is passed to the function(that calculates output logics).
- One the recursion reaches the PI gates of the circuit, the output values are pushed into a vector of char objects that are used to calculate the gate outputs in the previous recursive call.
- Once the output value of a gate is obtained at different stages of recursion, they are set using setvalue() method of Gate class.
- I defined another function that returns the integer values of the corresponding gates by taking gate names as input. I used it to select the gates.

Problem experienced:

- My design is not able to get the correct output value. It shows zeros.
- The recursive call reaches all the gates on the input end. I checked it by printing gatetypes of each gate. I have also checked my logic gate functions but couldn’t really come up with a proper solution.