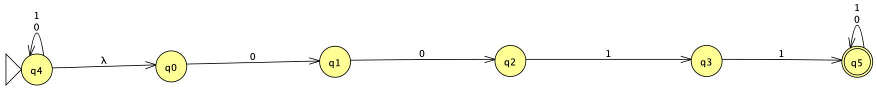
Week 2 HW, distinction tasks

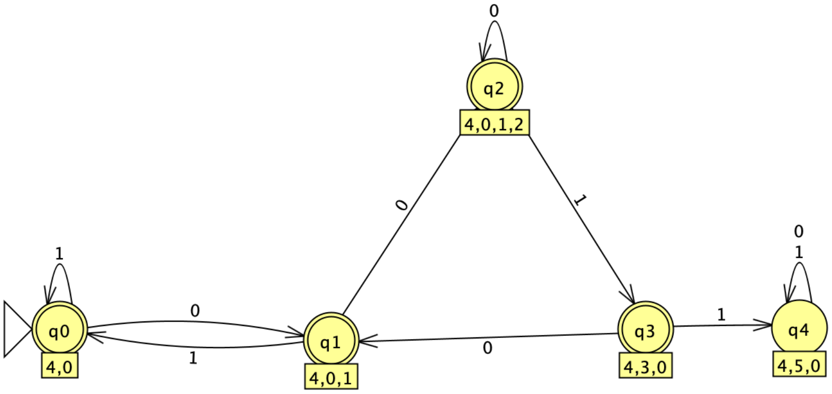
Task 1)

The regex of such a substring would involve non-`0011` containing substrings at the start, end and between the `0011` substrings. So we could first attempt to find those



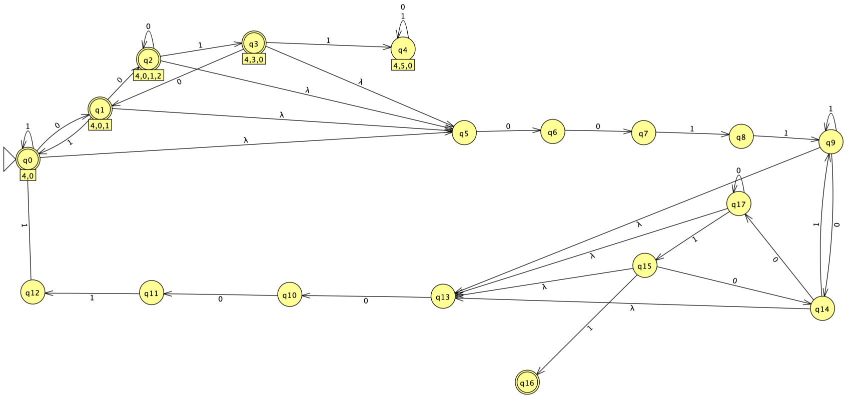
NFA of a string that only accepts 0011

We use the above to find a DFA that does not accept 0011, which is as follows,



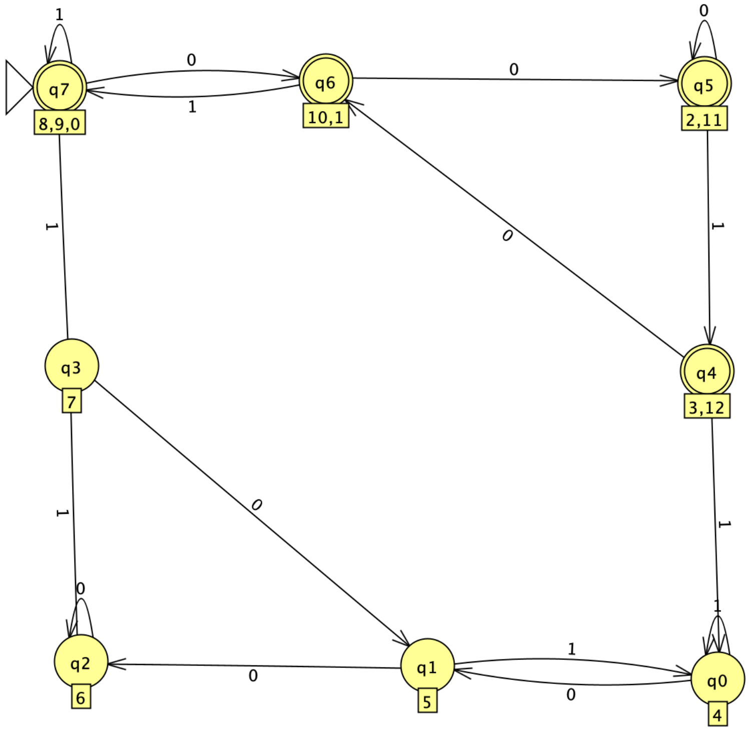
substring with no 0011

And, by combining it, we can obtain the final epsilon-NFA



NFA constructed as described at first

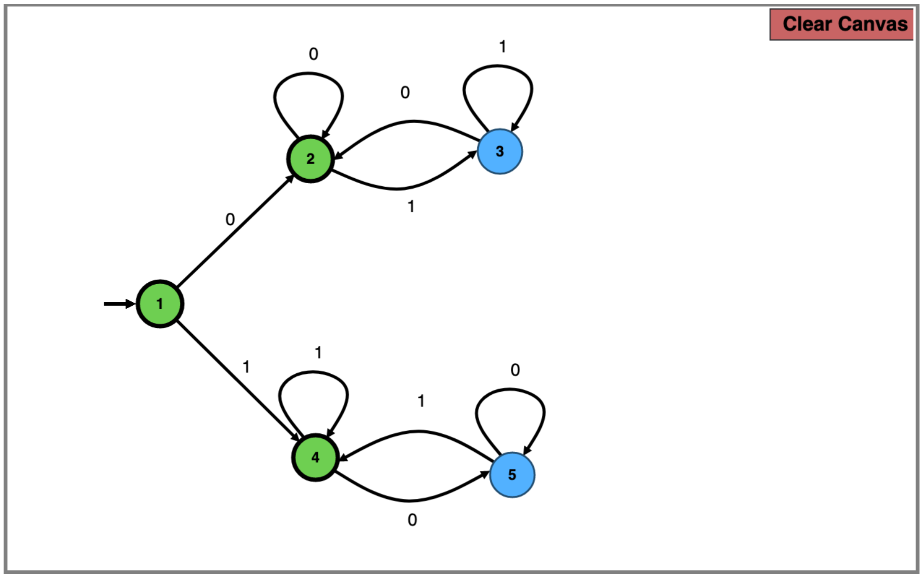
The final minimized DFA obtained would be as follows



Final DFA that contains even number of `0011`

Task 2)

We could notice that, if the number of occurences of `01` and `10` as substring in a string will be equivalent, if we start and end with the same symbol. This proof will be omitted for informality. However this will result in a DFA that is the same as C-2b, with the difference that the initial state is also an accepting state (since `epsilon` is now acceptable).



DFA of D-2b