

UNIVERSITY OF DAR ES SALAAM
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION
ENGINEERING
ES 222: PRACTICAL IN DIGITAL ELECTRONICS
EXPT 6: DESIGNING WITH SEQUENTIAL BUILDING BLOCKS

Aim: To design digital circuits driven by sequential devices

Instructions:

All experimental parts in this experiment should be handed in as one report. Emphasis should be placed on the design techniques introduced.

- A. Design and implement a mod-4 Up-Down counter using D-flip flops. Note that a separate control is used to enable Up or Down operations.
- B. Consider a circuit with two blocks. The first is a counter which can be controlled to count Up or Down. The second is a controller whose function is to control the UP/DOWN operation of the counter. Design the circuit so that it counts up when it is at state 0; and down when it is at state 3 automatically.
- C. Consider a circuit consisting of a counter which operates such that it loads a number at its inputs, counts up to state 9 and repeats the operation continuously. Design the circuit.
- D. Consider a circuit with two blocks. One is a number generator like the one in part C except that the initial number loaded is 0. The other is a PIPO register which is fed with only one number from the number generator as the generator goes through its continuous operation. Select the number, design the circuit and implement it.

Report:

- a) In your report, include a design which you could use to select any number to be loaded into the register in part D instead of a single number.