December 25, 2020

Istanbul Technical University

Department of Computer Engineering

BLG 231E - Digital Circuits

Assignment 5

Due Date: Thursday, December 31, 2020, 23:59.

- Please **write and draw <u>neatly</u>**.
- <u>Please prepare your homework using a computer. Points will be taken off for handwritten submissions.</u>
- **Consequences of plagiarism:** Any cheating will be subject to disciplinary action.
- **No late submissions** will be accepted.
- **Submissions:** Submit your solution PDFs to Ninova. Please **write your full name** (first name and last name) **and Student ID** into your solution PDFs.

If you have any questions, please e-mail **Büşranur Bülbül (bulbulb17@itu.edu.tr).**

1) Analyze the synchronous sequential circuit given in the figure below by answering following questions:

a) Determine which model (Mealy or Moore) the circuit uses. Explain. ***(3 points)***
b) Determine the expressions for the input functions that drive the J_0, K_0, and D_1 inputs of the flip-flops. ***(12 points)***
c) Determine the expressions for the next states Q_0^+ and Q_1^+ (use Q_0 for the J-K flip-flop, and Q_1 for the D flip-flop) and the expression for the output Z. ***(25 points)***
d) Construct the state/output table. ***(35 points)***
e) Draw the state transition diagram. ***(25 points)***