Small bonus points for decorating your work with photos of nogginball games in progress, designs for nogginball uniforms and equipment, team logos, etc.

CSE370: Introduction to Digital Design
Winter 2000

Homework Set 9

DUE: Friday March 10, 2000, 12:30 pm

Please show *all* of your work. In certain problems, you may be asked to use Design Works. Otherwise, solutions do not have to be typeset, but may be if desired. In any case, your solutions must be legible. Please staple all the pages together. Make it clear which problem is which (especially important for the printouts from Design Works).

At the championship level, nogginball is scored by three referees. A goal is scored only when at least two of the three referees click their "yes" buttons within a two-second time period.

A game of nogginball consists of up to 8 rounds. As everyone knows, speed is important in nogginball, and getting the game over quickly is highly valued. The winner of a game is the first team to win three consecutive rounds. If neither team has won three consecutive rounds within 8 rounds, then the winner is the team which has the highest total score. If both teams earned the same number of total points, the team which earned their points in the shortest time is the winner. In case there is still a tie, the referees vote to decide the winner.

Design a scoring system for championship nogginball. It should include a specification of the referee's controls (what buttons or controls are present and what they mean, etc.) and specification of the output to a scoreboard., as well as internal structure design. (NB: The scoreboard is a relatively passive display unit which can't make decisions or do computation. It may have multiple display units of various types, which you can specify fairly freely, as long as they are generic and not specific to nogginball. You do not have to design the internal logic of the scoreboard.)

Hint: structure your design as a system of communicating units. Some might be in the nature of computational units; others might be storage; others might be in the nature of FSM control units. Specify inputs and outputs for each unit, and give internal logic for each unit. Give an overall design for the system which clearly shows the system inputs; the system outputs; and the internal connections between the units.

You can use small commercial parts of the type we have used before, or that you have designed yourself in any previous homework. If so, give a pin diagram and reference information for each such part. You can also use generic parts (such as multiplexers, decoders, etc.) without referring to a particular commercial part #, as long as you clarify what the part is doing and its interface. You cannot assume or use more complex units like "ALU"!).

Present your design neatly and clearly. Use DesignsWorks if at all possible.