

Project 2.1.6 AOI Circuit Design

Procedure

1. Define the Problem:
 - a. Create a team of 2-3 people in your table group.
 - b. Brainstorm ideas of control systems that could use AOI Logic under the following constraints.
 - i. Teams of 2 should have at least 6 inputs. Teams of 3 should have at least 8 inputs.
 - ii. The system must have a clear purpose and use.
 - c. Create a design brief that summarizes your design problem and constraints.
 - d. List tasks that need to be completed for the project and begin dividing tasks equally, to create a Gantt chart that represents the timeline of your project deadlines and tasks.
 - e. Select one member to create a folder titled P216_LastNames under their Unit 2.1 folder. List the last names of team members in alphabetical order with _ between. Share this folder with all remaining team members so that they "Can edit". All remaining team members should move this file into their DE folder from the "Shared with me" location.
 - f. Elect one person to create a Google Spreadsheet for your team Gantt Chart in this folder. Title the spreadsheet as P216_LastNames. The first tab of your spreadsheet should be your Gantt chart and then add additional sheets for the project log of each person in your team.
 - g. Elect one person on your team to create a Google Document titled P216_LastNames. Create a title page as the first page and then table of contents on the second page. Begin your design brief on the third page.
2. Circuit Design:
 - a. Determine your inputs and output definitions.
 - b. Part 1: Create your truth table based on your definitions and design specifications.
 - c. Part 2: Write the un-simplified logic expression for your output function.
 - d. Part 3: Write the simplified logic expression for your output function. Use Boolean and DeMorgan's laws to demonstrate the correlation between the simplified versus unsimplified versions.
3. Implement & Test:
 - a. Part 4: Create the simulation of your circuit in Multisim. Verify it is working correctly by checking it against your truth table.
 - b. Part 5: Build your circuit using the needed logic gates. Verify it is working correctly by checking it against your truth table.
4. Document & Present:
 - a. Part 6: Calculate the cost of implementing your circuit with the components that you used. For standard prices across teams, use costs indicated on Electronix Express.
 - b. Part 7: Complete your document with the following sections.
 - i. Title Page - team members names, date, period, project name
 - ii. Table of Contents - corresponding sections and page numbers
 - iii. Design Brief - all design brief sections fit to one page
 - iv. Design Specifications & Truth Table - input/output definitions, truth table, paragraph explanation of output requirements
 - v. Output Logic Expression & Simplification - algebraic expression and simplification shown neatly
 - vi. Solution - Simulation & Breadboard - images of simulation and breadboard shown clearly, multiple views as necessary, labels and descriptions of final design, spreadsheet with estimated cost of implementing circuit with components used
 - c. Part 8: Oral Presentation - Demonstrate your working prototype to the class. Use your document to discuss your design process.

File Submission - Inbox your folder containing all project files.