Preliminary Proposal
The documentation is aimed at establishing the project and its specifications. You are limited to 2 pages. It must include the following:

- Your selected group, the selected project and an approximate individual project breakdown between the members in the group.
- The design method that will be used to implement the project. For example, what type of algorithm, what type of circuit, exact pseudo code or diagrams is not necessary at this point.
- The deliverables include its functionality.
- Rough estimate of material needed to be purchased.

Preliminary Proposal Presentation
The presentation is aimed at educating the class about your project so that we all know what every one is doing. The presentation is limited to 10 minutes. It must include the following:

- A brief, easy to understand explanation of your project without much detail.
- A breakdown of who will perform each task.
- A list of hardware to acquire.
- Name of sponsors if any.

Final Proposal and Presentation
The documentation is aimed at establishing the exact task and its exact set of specifications. You are limited to 5 pages. At a minimum it must include the following sections and each section should be clearly marked:

Proposed Project and Group: Your selected group, the selected project and the individual project breakdown between the members in the group.

Design Method: The design method that will be used to implement the project. For example, what type of algorithm, what type of circuit, exact pseudo code or diagrams is not necessary at this point.

Deliverables: The list of deliverables including all hardware and software and its functionality. You will not actually deliver the project it to me but it must be presented as thou you were.

Materials: Breakdown of the material needed to be acquired with their corresponding price if available and how you will acquire this hardware.

Statement of Work: Approximate timetable. Breakdown of the project among the team members clearly showing each task and who will perform each task.

Sponsorship: Name of sponsor if any and established agreements with sponsor.

The presentation is aimed at educating the class about your project so that we all know what every one is doing. The presentation is limited to 10 minutes. It must include the following:

- A brief, easy to understand explanation of your project without insignificant detail.
- A presentation of the alternative methods you considered before selecting the one to be used.
- A presentation of your chosen method.
Final Design Report
The documentation is aimed at establishing a set of design specifications including all known details. It is limited to 100 pages and should report all of the effort your team put into this course. This report is used in part to determine the final grade for this course by measuring the amount of work put into the design and the quality of the design report. At a minimum it must include the following sections and each section should be clearly marked:

Method Used: All algorithms that will be used. You may use pseudo code, charts and other diagrams. All circuit diagrams that will be used. A diagram showing its overall structure including hardware and software.

Material Used: A complete list of all hardware that will be used.

Statement of Work: Precise timetable. Precise breakdown of the project among the team members clearly showing each task and who will perform each task.

Testing and Demonstration: Detailed testing method that will be used. Detailed demonstration method that will be used. Back up plan that will be used in the event of unforeseen problems such as parts not available, team members dropping out, not being able to meet the functionality etc.

Appendix: The specification sheets or data sheets for all of the hardware that will be used. If the specification sheets are too large then summarize it and indicate where to find the specification sheets.

The presentation is aimed at educating the class about your selected methods so that the class may critique it or give you ideas. The presentation is limited to 10 minutes and must include the following:

- Brief explanation of the algorithms.
- Brief explanation of the circuit schematics
- The list of hardware to be used and what each does.
Final Presentation
The documentation is aimed at recording your work so that it may be modified or reproduced by other people in the future. It must include the following:

- All algorithms that were used. You may use pseudo code, charts and other diagrams.
- Code listing with good documentation in the code.
- A structured chart, or other types of charts that you deem appropriate, to present the structure of your code, i.e. what function calls what function and what information is passed.
- Diagrams explaining all the data structures used.
- Results of software testing. This proves it works.
- All circuit diagrams used.
- Plots of any circuit output like the information in data books. Only include data that is relevant.
- Building maps of the circuits. This allows other people to modify the circuits.
- A list of all hardware devices used.
- Any significant characteristic about the hardware that was not obvious from its specifications. This will save time when other people try to work with that hardware.
- The specification sheets of the hardware devices. If the specification sheets are too large then summarize it and indicate where to find the specification sheets.
- A complete list of all material including all hardware as well as wire, chips, etc that was used.
- An approximate number of hours spent on each task. This gives an idea to other people of the difficulty.

The presentation is aimed at demonstrating to the class your accomplishments during the course and must include a demonstration of the functionality of your project. This may be a film if the actual demonstration through execution is not feasible. The presentation is limited to 10 minutes.
**Code Documentation**

All software code must be well documented. The documentation must be in the code itself using the /* … */ or the C++’s // comment to end of line features. Each function must include the following information:

- What the function does.
- The algorithm it uses.
- The input.
- The output.
- Any assumptions.

For example:

```c
// This function pushes an integer onto the stack and updates the stack’s front pointer.

//
// Algo:
//    Get a new node.
//    If you got it successfully
//        Copy the inputted integer to the data field.
//        Copy the FRONT pointer to its NEXT field.
//        Copy the address of this new node to the FRONT pointer.
//        return 0
//    else
//        return -1
//
// The inputs are:
//    DATA - The integer to push.
//    FRONT - The pointer to the front of the stack.
//
// The outputs are:
//    none.
//
// Assumptions:
//    If a new node is not created the function does not print an error message.

int push( int data, node *front)
{
    code.
}
```

Remember that you are working with a large team. This is not the situation you have in most other classes where the code will only be looked at by you and will never be modified after the semester end. In this course we all will need to understand everyone’s code. Also this is not an academic exercise that you trash at the end of the semester. Other people in future competitions must understand and modify this code. Functioning code that is not well documented will be useless in any future competitions. Also this code is to be delivered to our sponsors as part of an agreement for their support.

**Circuit Diagrams**

All circuit diagrams must be such that I can reproduce the circuit board. It must list all parts numbers used. I must also be able to look at the circuit diagrams and the circuit boards and figure out where each point in the diagram is on the board. Other people in future competition will be interfacing and modifying the boards. It is extremely important that the circuit diagrams are accurate and up to date. You must maintain your diagrams up to date with and boards. If you do not maintain the diagrams up to date I will have you disassemble the board, determine the diagram and rebuild a new board!!