CSC 450, Senior Research
Research Outline

1. Write an **outline** for your paper, by completing the template below. An outline consists of section headings, subheadings, and bullet points. **Each bullet point should be a <u>single</u> sentence that will be expanded on when you write your paper** (except for Methods, see below)**.** This sentence should be specific and appropriate to include in your paper (it should not say *what* you are going to include. (For example, in describing bladder cancer, I would say: *bladder cancer is the 4th most common cancer in males*; I would <u>not</u> say: *statistics about bladder cancer*. If appropriate, an alternate set of section headings can be used with my approval. The *Results* section contains an unbiased presentation of the results (a presentation of the work completed and data generated or collected following the Methods), and includes new methods or simulations, if this is part of the research. The *Discussion* section interprets the results, puts them in the context of the topic, and discusses their significance, limitations, and future work (see notes for an example).

   For those working in a group, you must include a section for **Member contributions and alternative approaches**, with subsections for each person, as outlined below. The purpose of this section is to make sure that each person can complete a project in the event that one or more of their group members are unable to (e.g., they get sick or flee the country). This is an important aspect of research (see examples below).

Using the template below, replace italics with appropriate bullet points

Project Title: _____

Name(s): _____

I. **Introduction (must include at least 2 citations in IEEE format)**

   a. Background (add at least 2 facts that provide necessary background)

      i. *Background point #1*

      ii. *Background point #2*

   b. Problem statement / objective / hypothesis

      i. *Description of your problem statement, objective, or hypothesis*

   c. Significance (add at least 2 points that describe the significance of your specific project)

      i. *Significance point #1*

      ii. *Significance point #2*

II. **Materials and Methods** (add at least 3 points describing the methodology in detail)

    a. *Method description #1*

    b. *Method description #2*

    c. *Method description #3*

III. **Results** (describe at least 3 figures or tables that will be presented; figures may include screen shots of code or software, or diagrams describing an aspect of a method, like the room configuration in a simulation of evacuation. Figures should be described in detail. Most figures will take the form of graphs that present data -- graphs should include the type (scatterplot, bar graph, etc), along with the x and y values; table descriptions must include descriptions of the columns and rows.)

    a. *Figure or table description #1*

    b. *Figure or table description #2*

    c. *Figure or table description #3*

IV. **Discussion (related work includes at least 2 citations in IEEE format)**

    a. Summary of your main (expected) findings

        i. *Expected finding #1*

        ii. *Expected finding #2*

    b. Related work (provide a 1-sentence summary and <u>cite</u> at least 2 related findings that will be discussed in the context of your results)

        i. *Related finding #1*

        ii. *Related finding #2*

    c. Limitations (include at least 2 limitations related to your project)

        i. *Limitation #1*

        ii. *Limitation #2*

References **(add a bibliography for the references in your outline using IEEE format)**

V. Member contributions and alternative approaches (for group projects only; see examples below)

    a. *Person #1*

        iii. Project contributions: *description of the research that this person will do for the project*

        iv. Alternative approaches (if necessary): *If this person's part of the project is dependent on somebody else's work, you must also describe your backup plan for what you will do if that work is not completed*

    b. *Person #2*, etc

Examples:

1. If you are developing a model and someone else is testing or experimenting with it, then you should describe a (possibly simpler) test or experiment as a "back-up" plan in the event that the other person is unable to test or experiment with it.

2. If someone else is collecting data and you are implementing a model to analyze that data, then you will need a "back-up" plan for the collection of a (possibly simpler) dataset that can be analyzed if the other person is unable to collect the data.