TJHSST Computer Systems Lab Senior Research Project
Title of Project
2006-2007

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October 13, 2006

Abstract

Use this abstract section as your problem statement. This is an introduction to the purpose of your research project. What is the subject of the project, what are your goals, what is the project about? Also consider why is the project worth doing, and why is it a good topic for the Computer Systems Lab? Think of who will might be interested in your expected results and how might the results be applied? (prospective results at this point - you may not currently have any actual results determined)

Keywords: genetic algorithms, algorithmic composition - List any special vocabulary words that will apply to this research area.

1 Introduction - Elaboration on the problem statement, purpose, and project scope

1.1 Scope of Study

Describe the overall bounds of the work that will be involved, the research or data that will be required, and the relationships and variables that will need to be programmed. You may experience difficulty finishing your projects

because of complexities encountered along the way, during the school year. In this case, you have to narrow down your research/project objectives.

Be as specific as you can about what you want to develop. Think of drawing a boundary around the area of study that you think you can finish. If your project idea is too extensive, select a more modest piece of your original project idea to work on. An iterative development plan will help, one in which you start with what may be a relatively simple program you know you can write, then expand on this step by step throughout the year, adding more complexity as you go along.

1.2   Expected results

Describe or characterize in detail your prospective results. Research tries to add something new to the body of knowledge in a particular field and also seeks to find answers to a problem. This involves a systematic and intensive study in which the primary aim is a fuller knowledge or understanding of the subject under study.

What are you desiring to learn about with your project this year? Why are you doing this project, what is your central focus? Two basic purposes of research are to learn something and/or to gather evidence. Research can advance existing knowledge in a discipline, subject area or field. It may fill gaps in such knowledge and can be used to devise new modes or means of expression. In a broad sense, new perspectives in sciences, arts and humanities can be developed.

1.3   Type of research

There are three general areas or focuses of research that your project should fall into:

Pure basic research, performed with the goal of fundamental understanding (such as Bohr's work on atomic structure).

Use-inspired basic research, to pursue fundamental understanding but motivated by a question of use (Pasteur's work on biologic bases of fermentation and disease)

Pure applied research, motivated by use but not seeking fundamental understanding (such as that leading to Edison's inventions)

Which category of research is a good fit for your project?

2 Background and review of current literature and research

Elaborate on the background, previous or current studies by other people, books or papers, in your area of interest. Give an example(s) of a project(s) similar to yours. Demonstrate that you have looked into and read about the background area of your topic. What kinds of research have been done before in this area? How have others gone about trying to solve similar problems you are interested in? In what ways may your approach build on and vary from previous work that has been done in your project area?

3 Procedures and Methodology

Show that you understand your task and have a logical time plan for your research, design, programming, and testing phases of your project. Identify the resources you will need, tasks that will have to be accomplished to meet your objectives? What and programming language or other software will be necessary?

What visuals can you construct - charts and graphs that aid in portrayal of the information your program is generating. What input data may be needed, and how will you collect this data?

What methods and processes will be used to test and analyze your program's performance and the meaning(s) of your results. What types of error analyses can you do?

What kinds of testing can you do to verify your program? Dynamic testing uses random inputs to your program. Specific structural and functional testing (how you verify particular sections of your program are working correctly) and path and branch testing (picking particular inputs that test internal paths of performance of your program) and are good techniques. Process modeling is a good verification technique in which you determining mathematical formulas that can be used to validate the performance of your program, check the predictive quality of your program. For example, how well does your program model existing or expected phenomena, and how well your program may be used to predict behaviors based on future input.

Requirements and specifications: Defining requirements for your program and the structure of your program, outlining these requirements in written

form, and defining specifications you can use for verifying how well your actual program meets these requirements.

You could describe particular algorithms you'll be using and learning about.

4   Expected Results

Summarize again what results or analyses you expect to obtain from your project? How will you portray these results and analyses - include visual methods such as graphs and charts.

Can you see possible contributions your prospective results could give to future researchers? (or next year's seniors who would like to do a similar project)