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**Process/Task Estimation Technique**

The tasks required for this project can be broken down into the three main categories of planning, design, and production.

**Planning**Planning includes all documentation tasks including estimations, a breakdown and analysis of the problem, methods of communication, and requirement gathering.

* **Estimations**:  
  The time involved in producing the estimations includes each member gathering information on their past projects to produce a value for the number of lines they code over time working on a project (hours in this case), and assessing the difficulty each member has with different types of functions based on their assigned sections of the project. This process is expected to take roughly 40 minutes per member, along with an assembly of the information at 20 minutes for one member, totaling **3 hours**.
* **Analysis:**To analyze and breakdown the problem, the requirements must be evaluated. To make a list of requirements from specifications given is expected to take roughly 30 minutes as a group to ensure nothing is missed. This is to be followed by time spent gathering further clarification on requirements as issues arise, taking about an hour, totaling **3 hours**.
* **Methods of Communication:**Settling the manner of communication to be used with members of the group is estimated to be 20 minutes as a group, as well as an additional 20 for the leader to establish methods with the project managers. Accounting for six meetings to work out assignments, questions, and coordination at 1 hour long with all members in attendance, communication time totals **25 hours and 40 minutes.**
* **Tool Familiarization**:  
  Time for each member to become accustomed to and familiar with the various tools and software necessary to communicate and collaborate must also be accounted for. With four programs new to a majority of the members, an allotment of 20 minutes per program is given. This makes for 1 hour and 20 minutes per person, at **5 hours** total.
* **Documentation:**The bulk of the time consumed in planning will be the documentation and artifact generation for all the estimates and plans. For the various amounts of information to be discussed in each artifact, and the time to sort and present the information necessary, there is an estimate of 4 hours per major section. This results in an estimation of 6 hours per member, totaling **24 hours**.

**60 hours and 40 minutes**

**Design**The design phase of the project consists of the tasks of developing algorithms from the requirements and preparing test cases for the algorithms.

* **Communication:**  
  The bulk of the communication is centered around gathering the requirements properly to make sure the project is done correctly and solves the correct problem. This is estimated to take 4 half hour meetings to update assignments and track proper progress, three regular 1 hour meetings for questions and task clarification, two 2-hour meeting to review document drafts, and one 4-hour meeting to review and assembly of final document, totaling **52 hours.**
* **Requirements Gathering:**  
  Before the algorithms can be developed the requirements must be gathered, and analyzed. This includes decomposition the functionality into a list of requirements, seeking clarification on any assumptions that would have to be made, and reporting a definitive list encompassing the complete list of requirements. Based on the number of current requirements and assuming they at worst double, this is estimated to take 2 hours as a group to go through the given requirements and create a list, 1 hour to list assumptions and formulate questions, and 1 hour to compile a final list with 30 minutes to double check the list for anything missing, totaling **18 hours**.
* **Algorithms:**  
  Time consideration for the algorithm stage begins with deciding how to handle, store, and format the data. This decision as a group should take about 30 minutes. Based on the initial presentation of functionality and their complexities, assuming the final list is double, the algorithm design should take an estimated 8 hours. A second check on the correctness of the algorithms, along with ensuring cohesion between them should take roughly 5 hours, totaling **13 hours**.
* **Test case preparation**:  
  The design of test cases for the algorithms should take 1 hour and a half as a group, with a second check for missing test case possibilities taking about 45 minutes, totaling **9 hours**.

**92 Hours**

**Execution**The final phase is the actual coding, running the test cases, and debugging the program.

* **Communication:**Communication for this part of the project is expected to be four 30 minute meetings, two 1 hour meetings, and two longer 3 hour meetings for finalizing documents, totaling **36 hours.**
* **Coding**:  
  The conversion of algorithm into code is at estimated to be a little over a quarter of the time to develop the algorithms, about **5 hours**.
* **Testing**:  
  Allowing time for set up and takedown, the time for running test cases is estimated to take about 1 hour per person, for a total of **4 hours**.
* **Debugging**:  
  Time allotment for debugging and addressing possible oversights based on time spent ensuring correctness of algorithms is **2 hours**.

**47 Hours**

**2.3.6 Process/Task Estimate**

The task estimate for the project based on the times to complete the tasks included in the planning, design, and execution is **398 hours and 40 minutes**.