**Why we use math in Software Engineering? P.2**

**Modeling software systems**. A model, even a mental one, should be created before construction of any artifact can begin. Most software development is like making art whereby an initial vision slowly takes form. Planned evolution, together with maintenance issues, is commonly ignored. This method is also acceptable for a few software projects, however with several such projects the a lot of the software engineer can learn and understand early, the better. Modeling is one vehicle for achieving this understanding, and mathematics is an important tool for building, checking, analyzing, and experimenting with models . Moreover, developing precise models using specification languages, as well as (in order of popularity) Z, Larch, and Alloy, is important for identifying specification errors, that are very expensive to correct once a software system is implemented. **Application domains**. software engineers will use mathematics to communicate with their colleagues, including engineers, scientists, mathematicians, statisticians, actuaries, and economists. mathematics is a rich, comprehensive, universal language for communication between such various groups. **Mathematical reasoning**. One definition of mathematical reasoning, attributed to an informal working group of computer science and math educators is: “Applying mathematical techniques, concepts, and processes, either expressly or implicitly, within the answer of issues, in different words, mathematical modes of thought that help us solve problems in any domain.” in the most general interpretation, each problem-solving activity is an application of mathematical reasoning. For example, think about the advantages of exercises requiring students to translate Arabic statements into prepositional or predicate logic form, these “modeling” exercises help them be additional precise and interested in the interpretation of Arabic statements. When clients or colleagues say, “A or B,” do they mean “inclusive or” or “exclusive or”? after they say, “for all” do they mean universal quantification? what's the supposed that means of “for all ...” once there are not any elements over that to quantify?. Mathematics in software Engineering describes many example applications of mathematics in computer science. the subsequent simple linear search problem illustrates the use of logical reasoning to derive an algorithm. the problem statement is: realize the location of the first instance of a specified item during a list of items, the specified item is understood to be within the list. Develop an algorithm for this problem. think about the following questions : how many items are in the list? can the list be empty? what is the items in the list ? What happens if the specified item appears over once? and what's meant by “first instance” and by “location”? Addressing these questions and using the given problem info allows software engineers to formulate representative pre and post conditions required to make sure the problem is well define.

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