

Probability Theory Project Outcome:

In this project students will apply the concepts of probability theory. They will first develop a probability distribution and then use it to determine probabilities for several scenarios related to Car Repairs. Throughout the project, students will be mindful of a probability being a number between 0 and 1 (included). Also, students will have the ability to apply the concepts of independence, complement and disjoint (also mutually exclusive) events as well use Multiplicative rule or the Addition Rule as and when appropriate.

Instructions for submission:

There are 5 questions that students are addressing. Each question must show detailed work where appropriate and explain in written the rationale behind the work. Students may chose to submit a word document or scan and submit a neat hand written work.

The trouble of Car Repairs

A consumer organization estimates that over a 1-year period 17% of cars will need to be repaired once, 7% will need repairs twice, and 4% will require three or more repairs.

1. Provide a valid probability distribution showing the possible number of car repairs and their respective probabilities. (Recall a valid probability distribution is one where each probability is a number between 0 and 1 and they all sum up to 1).
2. If you own two cars, what is the probability that neither will need repair? Show your work in detail.
3. If you own two cars, what is the probability that both will need repair? Show your work in detail.
4. If you own two cars, what is the probability that at least one car will need repair? Show your work in detail.
5. What must be true about your cars in order to make the above approach valid? Do you think this assumption is reasonable? Explain.