For commercial vehicles such as trucks and buses it is important that the repair and maintenance cost is low. Modern vehicles are complex electromechanical systems. When a failure occurs, it can be difficult for the mechanic to troubleshoot the vehicle manually. In computer-assisted troubleshooting the mechanic is aided by a computer system that diagnoses the vehicle and proposes actions to take in order to solve the vehicle problem such that the expected cost of repairing the vehicle is minimized. To achieve such a system, two problems need to be solved: the diagnosis problem of determining possible causes of the vehicle problem and the planning problem of deciding which actions to take to repair the vehicle. This thesis provides applied examples and a theoretical framework for solving both these problems using Bayesian statistical models and automated planning techniques.