

Abstract

Westinghouse Fuel Manufacturing in Västerås, Sweden, manufactures fuel rods for nuclear plants. Manufacturing-IT is a software development section at Westinghouse Fuel Manufacturing. This thesis involves the development of a unit testing methodology (UTM) for the Manufacturing-IT section, which currently does not follow a well-defined software test process.

By evaluating different unit testing best practices and UTM design issues collected from literature, articles, papers and the Internet, a UTM document was developed. The UTM document was developed according to requirements from Manufacturing-IT and as an extension to existing documents within the Westinghouse organization.

The UTM was evaluated by applying the methodology in a case study. A single unit within a production control system in the rod manufacturing workshop at the Westinghouse fuel factory in Västerås was tested. Besides from evaluating the UTM, the case study was intended to find software tools that could simplify the unit testing process, and to test the production control system unit thoroughly.

The 182 test cases designed and implemented revealed 28 faults in the tested unit. NUnit was chosen to be the tool for automated unit testing in the UTM. The results from the case study indicate that the methods and other unit testing process related activities included in the UTM document developed are applicable to unit testing. However, adjustments and further evaluation will be needed in order to enhance the UTM.

The UTM developed in this thesis is a first step towards a structured testing process for the Manufacturing-IT section and the UTM document will be used at the Manufacturing-IT section.

By using the methods and other unit testing process related activities in the UTM developed in this thesis, any company or individual with similar requirements for a UTM as Manufacturing-IT, and that performs unit testing in an unstructured way, may benefit in that a more structured unit testing process is achieved.