Determining engineering software requirements

Overview

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This standard identifies the competences you need to model the requirements for software as part of the product definition activity, in accordance with approved procedures. You will be required to construct a detailed brief or a request for change/modification order, containing sufficient information to define the expected contribution of the software component(s) to the product attributes (such as functionality, safety, performance). You will be required to define these requirements and to elicit all necessary information in order to carry out the software requirements definition. The source information will include requested enhancements, requests for rectification of erroneous functionality or the elimination of undesirable side-effect behaviour. You will need to select the appropriate software requirements expression tool to use, based on the type and complexity of the software functions to be developed. You will be expected to use current British, European, international and company standards to produce software requirements, which must have unique identities, date of creation/modification and other relevant information. Where abstract, high level requirements are progressively refined into more detailed specific requirements, the requirements definition must provide a mechanism for tracing these relationships between the requirements.

Your responsibilities will require you to comply with organisational policy and procedures for working in the software requirements team. You will be required to propose solutions to any problems with the computer hardware, software or procedures, for consideration by the relevant people in the software requirements authorisation organisation. You will be expected to work to verbal/written instructions and draft specifications, with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying software requirements procedures. You will understand the computer system and software used, and its application, and will know about the various tools and techniques used to produce the software requirements, in adequate depth to provide a sound basis for carrying out the activities to define the requirements specification.

You will understand the safety precautions required when working in the software development team. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

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Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety legislation, regulations, directives and other relevant guidelines
2. plan and prepare the software requirement modelling activities before you start them
3. use appropriate sources to obtain the required information for the requirements model to be created
4. access and use the correct requirements modelling software
5. use appropriate techniques to create the requirement models
6. use codes and other references that follow the required conventions
7. produce the finished models, with sufficient detail to allow implementation
8. make sure that models are checked and approved by the appropriate person
9. save and store the software model results as the appropriate file type and in the correct location
10. deal promptly and effectively with problems within your control, and seek help and guidance from the relevant people if you have problems that you cannot resolve

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Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working with software development environment hardware (to include such items as safety guidance relating to the use of visual display unit (VDU) equipment and work station environment such as lighting, seating, positioning of equipment; repetitive strain injury (RSI); the dangers of trailing leads and cables; how to spot faulty or dangerous electrical leads, plugs and connections)
2. how to return the work area to a safe and useable condition (such as cleaning down work surfaces; putting media, manuals and unwanted items of equipment into safe storage; leaving the work area in a safe and tidy condition)
3. the relevant sources and methods for obtaining any required technical information relevant to the model being produced (such as new model brief/request, specification sheets, request for changes or modifications to models, technical publications, calculations)
4. identification of the correct version of software tool, and the various techniques that are supported by the tool
5. how to access the specific software requirements model to be used
6. basic software requirements definitions
7. types of representation that may be produced by the modelling software (such as static structure, sequence diagrams, state machine representations)
8. the national, international and organisational standards and conventions that are used for the models/drawings
9. the application and use of modelling computer tools
10. how to access, recognise and use a wide range of standard components and symbol libraries from the modelling tools
11. the need for document control (such as ensuring that completed models are approved, labelled and stored on a suitable storage device)
12. why it is necessary to be able to recall previous issues of modified model
13. when to act on your own initiative and when to seek help and advice from others

Scope/range

1. Prepare for the software requirements definition activities, by carrying out all of the following:
    1. check that the working environment is in a safe and appropriate condition and that all working equipment is in
    2. safe, tested and usable condition (such as cables undamaged, correctly connected, safely routed)
    3. open the appropriate requirements modelling software
    4. set up the modelling environment and select a suitable template/folder
    5. identify relevant software requirements to be implemented
    6. identify the required standards and all relevant sources (such as enhancement requests, problem reports and the baseline requirements set)
    7. resolve any problems as they occur, within your level of responsibility
2. Use three of the following to obtain the necessary data to produce the required model:
    1. new model brief/request
    2. specifications (such as software acceptance tests)
    3. change order/modification request
    4. regulations
    5. technical publications
    6. previous models/designs
    7. calculations
    8. software problem reports
    9. standards reference documents (such as Universal Modelling Language (UML))
    10. technical notes (such as meetings/discussions, e-mail)
    11. other available data
3. Take account of seven of the following, as appropriate to the model being produced:
    1. function
    2. cost
    3. operating environment
    4. quality
    5. lifetime of the product
    6. interfaces
    7. testing method
    8. accuracy
    9. safety
    10. resources (such as memory, performance and bandwidth)
    11. ease of modification of model
4. Carry out all of the following before producing the software requirements model:

     1. ensure that the data and information you have is complete and accurate
     2. analyse the data and information to identify the model requirements
     3. recognise and deal with problems (such as technical issues and lack of information, or incorrect information)

5. Use one of the following modelling methodologies to produce the software requirements:
     1. object orientated requirements (such as Universal Modelling language (UML))
     2. state based automata requirements modelling tools (such as Statemate)
     3. formal mathematical requirements expression methods (such as Z, Vienna Development Method (VDM))
     4. functional requirements elicitation and refinement methods (such as Controlled Requirements Expression (CORE))

6. Create/modify the software requirements using four of the following:
     1. functions
     2. classes
     3. accuracies
     4. change requests
     5. interfaces
     6. performance
     7. state machine representations
     8. static structure
     9. sequence diagrams

7. Check the software requirements for all of the following:
     1. completeness
     2. coherence
     3. accuracy
     4. consistency
     5. traceability

8. Save and store the software requirements model in appropriate locations, to include carrying out all of the following:
     1. check that the model is correctly titled, referenced and annotated
     2. ensure that your model has been checked and that it complies with the organisational procedures
     3. save the model to an appropriate location (such as storage device, configuration database)
     4. register and store the model in the company information system (where appropriate)
     5. record and store any changes to the model in the appropriate company information system
     6. ensure that a separate backup copy is created and placed in safe storage

9. Produce models which comply with one of the following:
     1. company standards and procedures

2. customer standards and requirements
3. statutory regulations and codes of practice
4. software standards
5. BS, ISO or BSEN standards and procedures
6. other international standards

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