

THE OPEN UNIVERSITY OF SRI LANKA

Faculty of Engineering Technology
 Department of Electrical & Computer Engineering
 Bachelor of Software Engineering
FINAL EXAMINATION – (2009/2010)



ECX4267 – Software Engineering Concepts

CLOSED BOOK EXAM

Time Allowed: 3 hours

Date: 26th May 2010

Time: 0930 – 1230 hours

INSTRUCTIONS TO CANDIDATES

1. This question paper contains one question in **SECTION A** and three questions in **SECTION B** on 4 pages.
2. Answer **ALL** parts in **SECTION A**.
3. Answer any **TWO** questions from **SECTION B**.

NOTE:

1. Refer the article given in pages 3 & 4 when you answer the questions in section A of this questions paper.
2. State your assumptions (if any) clearly

SECTION A:

Answer **ALL** questions

Question 01

The following questions are based on the article "*How to change a wheel in an emergency*" in the pages 3 & 4. Assume you are going to implement a software system to automate the given tasks.

- | | |
|---|------------|
| (i) List down the functional and non-fictional requirements of the system | [05 Marks] |
| (ii) Draw USE Case diagrams with USE Case narrations of the system | [05 Marks] |
| (iii) Draw a flowchart to represent the algorithm of the system. | [10 Marks] |
| (iv) Draw Class diagrams for the system. | [10 Marks] |
| (v) Draw Sequence diagram of the system | [10 Marks] |
| (vi) Draw GUI for the system | [10 Marks] |
| (vii) Write pseudo code to implement the wheel changing operation | [10 Marks] |

SECTION B:

Answer any TWO questions

Question 02

- (i) Draw the software maintenance process activity diagram and briefly describe each process activity. [08 Marks]
- (ii) Briefly describe the categories of software maintenance and give examples for each category. [08 Marks]
- (iii) Briefly describe the software configuration management and why it is important for the software maintenance activities. [04 Marks]

Question 03

Briefly describe the following key issues in software design by giving examples.

- (i) Concurrency [05 Marks]
- (ii) Error and Exception handling and fault tolerance [05 Marks]
- (iii) Distribution of Components [05 Marks]
- (iv) Interaction and Presentation [05 Marks]

Question 04

- (i) What are the most common problems in writing requirements? [05 Marks]
- (ii) Briefly explain advantages & disadvantages of *at least five* requirements elicitation techniques. [15 Marks]



For Immediate Release:

How to change a wheel in an emergency

Yes, it will be raining. Yes, you'll be tired and anxious to get home. Yes, you'll be wearing smart clothes. Flat tyres never occur on sunny days, when you have time on your hands or when you're wearing gardening clothes. Fitting the spare wheel yourself is, nevertheless, a good option compared to waiting for a breakdown recovery service – it only takes a few minutes and you will draw admiring glances from passers-by!

But you must be prepared. Aside from a working jack and a spare wheel with an inflated tyre, you'll need a pair of gloves, a bit of old carpet to kneel on and a couple of small blocks of wood (about 50mm square). You may need a pair of cutters or a sharp knife, a flat-bladed screwdriver and a special socket for locking wheel nuts/bolts. Oh, and you'll also need a Haynes Owners Workshop Manual or the Haynes 'Your Car' glovebox guide.

Changing a wheel is straightforward, provided you know where the tools and spare wheel are kept, and how to use a jack. If you've just bought the car, or if you have never changed a wheel before, it is worth practising at home – then you'll know exactly what to do if you get a flat tyre.

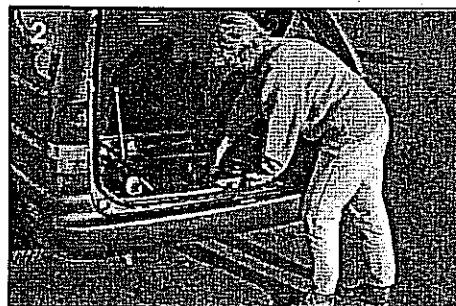
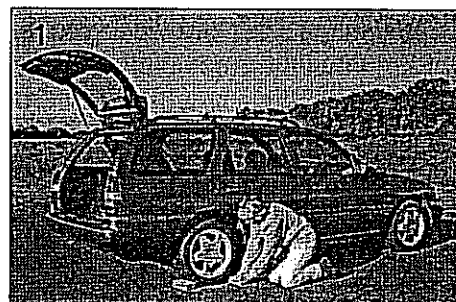
1. Apply the handbrake, engage first gear or set automatic transmission to 'P', then use the blocks of wood to chock the wheel diagonally opposite to the one that is being changed.
2. Put on the gloves, get out the spare wheel, vehicle jack and wheelbrace. They are generally located in the luggage area, under a cover in the floor (see in your car handbook for details).
3. Lay the carpet beside the flat tyre to kneel on. Where applicable, remove the wheel trim/cover – you may need to cut nylon cable ties fitted to stop theft - then prise off the trim or cover with a flat-bladed screwdriver. Use the wheelbrace to loosen each wheel bolt/nut on the affected wheel by about half a turn – if necessary, employing the special socket for any anti-theft bolts or nuts.

continued overleaf

Haynes, the world-leading publisher of automotive repair manuals, is renowned for teaching millions of car owners how to carry out routine maintenance and repairs. The manuals provide authoritative and accurate step-by-step information for both basic and more complex tasks.

Notes to Editors:

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4. Engage the jack head in the jacking point nearest the affected wheel (check your Haynes Manual for details). Slide the spare wheel part way under the car, near the wheel to be removed, but out of the way of the jack (this is a safety measure in case the jack slips). Raise the jack until the tyre is 25 to 50mm off the ground.



5. Remove the wheel bolts/nuts, and lift off the wheel. Drag out the spare wheel and slide the removed wheel under the car in its place.



6. Fit the spare wheel, then refit the bolts/nuts and tighten them until they are just holding the wheel firmly. Remove the wheel from under the car, then lower the jack and remove it.

7. Tighten one wheel bolt/nut securely, using the wheelbrace, and then tighten one diagonally or nearly diagonally opposite. Tighten the other one, two or three bolts/nuts in a similar way, and then refit the wheel trim, if applicable.



8. When you've finished, stow the removed wheel and the tools in their correct locations. Check the pressure in the new tyre, with your gauge or at the next available garage. In addition, you should have the wheel bolts/nuts tightened to the correct torque setting. You can do this yourself if you have a torque wrench; otherwise, a local garage or a tyre fitting depot can do it for you.



9. It's important to get the flat tyre repaired or renewed as soon as possible – don't put it off!

Be safe

If you get a flat tyre when you're on a journey, first make sure that the car is parked safely away from traffic. If you are at the side of a busy main road, and you cannot move the car, it is safer to call for assistance rather than risk an accident. Stop the car, switch on your hazard warning lights and set up a warning triangle if you have one. Do not put yourself or others at risk.

Tips

Positioning a wheel on the hub can be tricky, as you have to support its weight at the same time. If you find this difficult, try resting the wheel on your shoe to help you manoeuvre the wheel into position (but be careful not to hurt your foot).



Haynes Manuals retail at £17.99 (hardback) and are available from all good car accessory retailers and bookshops, including Halfords, Motor World and WH Smith. A comprehensive stockist locator can be found at www.haynes.co.uk.