Hw2 : the Q&A puzzle

An assignment to train your presentation.

Due date: 6/1 (TUE) 23:59 am (please do not submit late or plagiarize.)

(好孩子請勿遲交、抄襲，本作業不接受補交)

Goal:

To improve your ability to present and answer questions, for this assignment you will be asked to write a report answering the following questions. The report should contain a detailed description of the problem (how it occurred) and the current solution in the operating system (with hardware support), with examples of code write by yourself. Answers to the questions can be found in books and on the internet, but do not copy and paste them directly into a translation tool and don't use their sentence directly too (plagiarism). It is expected that approximately two pages of A4 and multiple pages of a slides will be required to answer this question and the results of this assignment will be quite subjective.

Question:

We mentioned the Peterson's Solution as a software-based solution to the CS problem (critical section problem) in the course of the chapter 6+7. However, what we did not mention is that this solution may cause problems when optimizing the execution order in modern operating systems (Mainly influenced by hardware). Why does it go wrong (with short code examples of what goes wrong and why)? And what kind of solutions are available in the operating system for this type of problem? Please first define what the CS problem is and explain the Peterson's Solution, which will further explain why modern hardware can go wrong and finally bring out the corresponding solution.

Keyword: Memory Barriers

Submission:

You can use any tool to write your work, but please convert the final product to PDF and do not encrypt and lock it. We expect to use the Turnitin (a plagiarism detection system) to check the content. Please name the file as s1234567_OShw2-1.pdf (and s1234567_OShw2-2/3/4... if needed. And Please put A4 documents in the 1st file) If you have multiple files, please compress them into a zip file (s1234567_OShw2.zip).

目的:

為了提升同學們對問題陳述與回答的能力，在這個作業中，我們將要求你撰寫一份報告來回答以下的問題，該報告應包含詳細的問題說明(問題如何發生) 以及目前作業系統的解決方式，並舉出自己的例子。相關問題的答案可從書本上跟網路上找到，但切勿抄襲(包含抄襲課本)、直接用翻譯工具翻譯並複製貼上。可以預期要回答這個問題需要約莫兩頁 A4 並搭配多頁的投影片，本作業的成績會包含相當的主觀成份。

問題:

關於 CS 問題(critical section problem)在上課的過程中我們有提到 Peterson's Solution 這個以軟體為基礎的解決方法。然而我們沒有提及的是這個解法在現代硬體在優化執行流程時，可能會出問題。請問為什麼會出問題(需用簡短的程式碼舉例出問題的情況與原因)? 以及針對這個類型的問題，在作業系統提供甚麼樣的解法? 請首先撰文定義甚麼是 CS 問題，並解釋 Peterson's Solution 這個解法，從而進一步說明現代硬體為何可能出錯，最後帶出相應的解決方案。

關鍵字: Memory Barriers

*作業繳交:

你可以用任何工具撰寫你的作業，但請將最終成果轉換成 PDF 並請勿加密跟上鎖。我們預期將使用 Turnitin 偵測剽竊系統來進行內容的檢查。請將檔名命名成 s1234567_OShw2-1.pdf (以及 s1234567_OShw2-2/3/4... 假如有需要的話，編號 1 的檔案請放 A4 文件) 若你有多個檔案，請壓縮成 zip 檔案 (s1234567_OShw2.zip)。