Introduction

Week 01 – Tutorial

Chapter 1.1-1.4 & 1.8, C

Tutorial's goal

Help you learn about OS

by solving problems

Outcomes

- You will:
  - learn how to approach problems
  - solve couple of problems
  - construct a problem for your classmate
- Today we work in pairs

Part 1: Solve a problem

Exercise #1

- First, you have to find a peer
- **Hint:** a neighbour…

Problem 1.1

- What are the two main functions of an operating system?

- **Hint.** You should know the answer !

Problem 1.3

- What is the difference between time-sharing and multiprogramming systems?

- **Hint.** You should:
  - recall the concepts (think a bit)
  - give the answer (explain in a couple of sentences)

Let’s try it!

- What is kernel mode?
- What is the difference between kernel and user mode?
- Explain how having two distinct modes aids in designing an operating system.

Problem 1.8

- One reason GUIs were initially slow to be adopted was the cost of the hardware needed to support them.
  - How much video RAM is needed to support a 25-line × 80-row character monochrome text screen?
  - How much for a 1200 × 900-pixel 24-bit color bitmap?
  - What was the cost of this RAM at 1980 prices ($5/KB)?
  - How much is it now?

Don't panic

Hint:

- This is a “calculation question”…
  - … you need some of basic intuition (2+2)
  - … or you need a formula from the book.
- This is a “pen&pencil” question:
  - write something
  - draw something
- That’s that simple

Let's try it!

- Consider a system that has two CPUs, each CPU having two threads (hyper-threading). Suppose three programs, P0, P1, and P2, are started with run times of 5, 10 and 20 msec, respectively. How long will it take to complete the execution of these programs? Assume that all three programs are 100% CPU bound, do not block during execution, and do not change CPUs once assigned.

Problem 1.15

- A computer system has cache memory, main memory (RAM) and disk, and an operating system that uses virtual memory.
- It takes:
  - 1 nsec to access a word from the cache,
  - 10 nsec to access a word from the RAM, and
  - 10 ms to access a word from the disk (10,000,000 nsec).
- If the cache hit rate is 95% and main memory hit rate (after a cache miss) is 99%, what is the average time to access a word?

Well done!

Take a break

Part 2: Construct a problem

Guideline: work in pairs

- Open the book, Ch. 1
- Select a topic (interesting for you)
- Read text, understand it and construct:
  - 3 “what is..” problems;
  - 2 “explain / compare” problems;
  - 1 “calculation” problem.
- With answers, please…, but do not share answers yet

Game

- Ask for a problem from the ‘left’ group:
  - For a correct solution you get 1 point per solution
- Propose your problems to the ‘right’ group:
  - If a problem wasn’t solved you get 2 points per problem
- Count your points

Summary + Questions

End

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