Indlejret Software Udvikling
Dispositioner

Aarhus School of Engineering

Eksamensnoter

Indholdsfortegnelse

List of Figures

List of Tables

1 Programs in relation to the OS and the kernel

1.1 Sub topics

- Processes and threads.
- Threading model.
- Process anatomy.
- Virtual memory.
- Threads being executed on CPU, the associated scheduler and cache.

1.2 Curriculum

- Slides "Intro to OS's".
- Slides "Parallel programs, processes and threads".
- OLA: "Anatomy of a program in memory", Gustavo Duarte.
- OLA: "The free lunch is over".
- OLA: "Virtual memory", pages 131-141.
- OLA: " Introduction to operating systems".
- OLA: "Multithreading".
- Kerrisk: Ch. 3-3.4 - System programming concepts.
- Kerrisk: Ch. 29 - Threads: Introduction.

2 Synchronization and protection

2.1 Sub topics

- Data integrity - Concurrency challenge.
- Mutex and Semaphore.
- Mutex and Conditionals.
- Producer / Consumer problem.
- Dining philosophers.
- Dead locks.

2.2 Curriculum

- Slides: "Thread Synchronization I and II".
- Kerrisk: Chapter 30: Thread Synchronization.
- Kerrisk: Chapter 31: Thread Safety and Per-Thread Storage (Speed read)".
- Kerrisk: Chapter 32: Thread Safety and Per-Thread Storage (Speed read)".
- Kerrisk: Chapter 53: Posix Semaphores (Named not in focus for this exercise)".
- OLA: "pthread-Tutorial" - chapters 4-6.
- OLA: "Producer/Consumer problem".
- OLA: "Dining Philosophers problem".

3 Thread communication

3.1 Sub topic

- The challenges performing intra-process communication
- Message queue
  - The premises for designing it
-
-
-
  - GoF Singleton Pattern
  - GoF Observer Pattern
  - GoF Mediator Pattern

3.2 Curriculum

- Slides: "A message system"
- OLA: "GoF Singleton pattern"
- OLA: "GoF Observer pattern"
- OLA: "GoF Mediator pattern"

3.3 Exercises

- The message distribution system

4 Patterns 2 - GoF Observer

4.1 Fokuspunkter

- Redegør for, hvad et software design pattern er.
- Redegør for opbygningen af GoF Observer.
- Sammenlign de forskellige varianter, af GoF Observer - hvilken vil du anvende hvornår?
- Redegør for, hvordan anvendelsen af GoF Observer fremmer godt software design.
- Redegør for fordele og ulemper ved anvendelsen af GoF Observer.
- Redegør for, hvilke(t) SOLID-princip(per) du mener anvendelsen af GoF Observer undersøtter.

5 Patterns 3 - GoF Singleton + Method/Abstract Factory

5.1 Fokuspunkter

- Redegør for, hvad et software design pattern er.
- Redegør for opbygningen af GoF Factory Method og GoF Abstract Factory.
- Giv et designeksempel på anvendelsen af GoF Abstract Factory.
- Redegør for opbygningen af GoF Singleton.
- Redegør for fordele og ulemper ved anvendelsen af GoF Singleton

6 Patterns 4 - State patterns

6.1 Fokuspunkter

- Redegør for, hvad et software design pattern er.
- Redegør for de forskellige måder at implementere en state machine på.
- Redegør for opbygning af GoF State Pattern
- Sammenlign switch/case-implementering med GoF State
- Redegør for fordele og ulemper ved anvendelsen af GoF State
- Redegør for, hvordan et UML (SysML) state machine diagram mapper til GoF State.