METRO STATE UNIVERSITY

ICS 232 Computer Organization & Architecture
Homework 12 - Chapter 8 - 10 points
Due Date: 8/2/2023

Name:

Note: Please post your homework to ICS232 D2L on or before the due date.

Chapter 8 – System Software

Essential Terms and Concepts

12. What is meant by preemptive scheduling?
Each process is allocated a time slice, when it expires, the context switch happens.

16. Besides process management what are the other two important functions of an operating system?
- Monitors activities of each process to avoid synchronization problems that could occur when processors use the same shared resource
- schedules process execution, provides the service to communicate with one another

24. Describe the purpose of each phase of a compiler.
- analysis: creates an intermediate representation from the given source code
- Synthesis: creates an equivalent target program from the intermediate representation
- Lexical analysis: scanning, reads the course code and breaks it into streams of tokens.
- Syntax analysis: takes the stream of tokens and checks whether they conform to the grammar of the programming language
- Semantic analysis: checks whether the code is semantically correct
- Intermediate code generation: generates an intermediate representation of the source code that can be easily translated into machine code
- Optimization: applies various optimization techniques to the intermediate code to improve performance
- Code generation: takes optimized intermediate code and generates the actual machine code that can be executed by the target hardware

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25. How does an interpreter differ from a compiler.
Interpreter produces the result of the program, compiler produces the program in assembly language

Exercises

4. What is the difference between multiprogramming and multiprocessing? Multiprogramming and multithreading?
- multiprogramming: executes multiple programs at the same time on a single device
- Multithreading: single resource used to process multiple tasks
- Multiprocessing: multiple processing units are used by a single device

9. Discuss the advantages and disadvantages of dynamic linking.
- advantages: allows module to include only informed for the DLL function, less time to load the program, less memory space needed, less disk space needed
- Disadvantages: performance cost to access the shared segment, more consumption of memory, difficult traversal, random access not possible, reverse traversing cause memory wastage

10. What problems does an assembler have to overcome in order to produce complete binary code in one pass over the source file? How would code written for a one-pass assembler be different from code written for a two-pass assembler?
- main problem is that it forwards the referencing before its defined. The solution could be declaring all data values before being used

13. What are the advantages of using a compiled language over an interpreted one? Under what circumstances would you choose to use an interpreted language?
- compiled code runs faster

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- When interpreters are easier to implement, debugging, interpreter code makes the intermediate code portable

15. Why is the execution environment of a Java class called a virtual machine? How does this virtual machine compare to a real machine running code written in C?
- because java byte code can run on any platform where the java runtime environment is available, doesn't need to be recompiled. Java uses a JIT compiler to compiler Java byte code to native machines at runtime. Comparing to C, java offers standard library, and other languages both support JIT and C.

17. We stated that only one method at a time can be active within each thread running in the JVM. Why do you think that this is the case?
Because the JVM follows the principle of "sequential consistency", the order of the operations in one thread should be the same as the order in which is observed by another thread, principle ensuring that the behavior of the program is consistent and predictable.

Prepare for next class by reading Chapter 9 – Alternative Architectures

Continue working on Project 2

Continue working on Your Group Project