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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

COMPUTER SCIENCE AND ENGINEERING

Semester 5

CS9303 System Software Internals

(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Describe the different instruction formats found in any one example architecture.
2. Give an example that illustrates the need for multi pass assemblers.
3. Distinguish between a linking loader and a linkage editor.
4. What are overlays?
5. Give an example of how macro keyword parameters are used.
6. List different steps (phases) in a compiler.
7. Briefly discuss the Java Native Interface.
8. What is the Microsoft Interface Language (MSIL)?
9. Differentiate between a process virtual machine and a system virtual machine.
10. Briefly discuss different aspects of grids.

Part – B (5 x 16 = 80 marks)

11. Choose any specific assembly language. A control section is usually a section of assembly language instructions that will be assembled into a separate object file (or object module). One or more such object files will be input to a linker (where a linker is either a linkage editor or the linking part of a linking loader).

Consider a hypothetical utility that takes several such assembly language control sections as input. The output of this hypothetical utility is a single assembly language program. This single assembly language program can be input to a traditional assembler to get a single object program that can be directly loaded.

In other words, this hypothetical utility combines several input assembly language files to generate a single assembly language file, which can then be assembled into a loadable object program (that is, further linking is not done.)

(i) Attempt to discuss the issues involved in having such a utility. (4)

(ii) Attempt to develop the important aspects of the design of such a utility. Use pseudo code (or any other standard method of presenting the design). (6)

(iii) Trace through the behavior of the utility for appropriate examples. (6)

12. a) (i) Consider any example machine architecture, and describe at least 3 different addressing modes that are available in that architecture. Give assembly language examples for each of them. (3)
- (ii) Consider one example and show how it is processed by an assembler. (5)
- (iii) Describe in detail how the external symbol table is used with respect to automatic library search. (8)

OR

- b) (i) Consider any example machine architecture, and describe at least 3 different special purpose registers that are available in that architecture. Give assembly language examples for each of them. (3)
- (ii) Consider one example and show how it is processed by an assembler. (5)
- (iii) Describe in detail how the external symbol table is used during the first pass and during the second pass of linking. (8)
13. a) (i) Give an example of a macro definition by another macro. (4)
- (ii) How will this example be processed. (6)
- (iii) Specify the token types and show the steps in the lexical analysis of a simple input. (6)

OR

- b) (i) Give an example of a macro invocation by another macro. (4)
- (ii) How will this example be processed. (6)
- (iii) Specify a small grammar and show the steps in the syntactic analysis of a simple input. (6)
14. a) (i) List the different types of instructions in the Java Instruction Set. (4)
- (ii) Explain in detail how any three of the types can be handled in a Java Virtual Machine. (12)

OR

- b) (i) List the different types of garbage collectors. (4)
- (ii) Explain in detail how any three of them work. (12)
15. a) (i) Describe an interpretation emulator (decode & dispatch). Discuss the issues. (8)
- (ii) Discuss the different aspects of profiling. (8)

OR

- b) (i) Describe a binary-translation emulator. Discuss the issues. (8)
- (ii) Discuss the different aspects migration. (8)