1. Fill out the following blanks in order on the answer sheet. (21%)

   (a) The one-pass assembler that generates its object code in memory for immediate execution is called a __(1)__ .

   (b) When a computer is first turned on or restarted, a special type of absolute loader, called a __(2)__ , is executed.

   (c) __(3)__ uses facilities of the operating system to load and link a subroutine to the rest of the program when it is first called.

   (d) To get around the problem of having duplicate labels resulting from several macro invocations, we can use __(4)__ in the macro.

   (e) A programming language has two major components: syntax and __(5)__ .

   (f) A __(6)__ is a software tool that can be used to help in the task of compiler construction.

   (g) The __(7)__ of an identifier is the portion of the program in which the identifier can be referenced.

   (h) An __(8)__ executes a version of the source program directly, instead of translating it into machine code.

   (i) BNF (Backus Naur Form) is capable of defining a __(9)__ grammar. This grammar can describe the syntax of a language if valid sentences in the language can be derived by simply replacing a nonterminal for its right-hand side.

   (j) A table, called __(10)__ , contains mappings to the physical locations of all clusters in all files on disk storage.

   (k) One of the most important functions of the file manager is the automatic performance of __(11)__ and __(12)__ operations on files being read or written.

   (l) This situation is an example of __(13)__ : a set of processes each of which is permanently blocked because of resources held by the others.

   (m) A semaphore is an integer variable that, apart from initialization, is accessed only through two standard atomic operations: __(14)__ and __(15)__ .

   (n) A program causing page faults every few instructions is said to be __(16)__ .

   (o) In UNIX, the command interpreter is called a __(17)__ , and a new process is created by the __(18)__ system call.

   (p) The __(19)__ is a collection of low-level device drivers that serve to isolate MS-DOS from the details of the hardware.

   (q) A collection of programs designed to create and manage databases is called a __(20)__ .

   (r) A __(21)__ provides each user with the illusion of running on a separate machine.

〈背面繼續〉

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2. Give and describe the four classes of interrupts on a traditional computer. (8%)

3. What methods might a programmer use to improve the locality of reference of a program? What programming techniques and data structures would probably lead to poor locality of reference? (6%)

4. List and describe the three major steps in the compilation process. (9%)

5. Give and describe at least four methods for CPU scheduling. What is the difference between the long-term scheduler and the short-term scheduler? (10%)

6. (a) What are the two methods for specifying relocation for the loader? (4%)

   (b) Under what circumstances is each of them more efficient? Why? (4%)

7. (a) Explain in detail what the differences are between a linkage editor and a linking (/relocating) loader. (4%)

   (b) Under what circumstances is each of them preferable? Why? (4%)

8. (a) What are the program blocks? (4%)

   (b) What are the advantages of using program blocks? (4%)

9. (a) What are the control sections? (4%)

   (b) What is the difficulty when translating a program with multiple control sections? (4%)

10. (a) Explain why most assemblers make two passes over the source program. (2%)

    (b) List the major functions performed during Pass 1 of the assembler. (3%)

    (c) List the major functions performed during Pass 2 of the assembler. (3%)

    (d) What are the major data structures used by the assembler? Also explain their purposes. (6%)