Introduction to Minicomputers
Final Examination

EVALUATION SHEET

Circle the letter on your answer card that corresponds to the response that *best* answers or completes each of the 50 items on this test.

1. Digital computers are controlled by

    a.   connections on a patch-panel.

    b.   electrical voltages.

    c.   manually entered commands.

    (d.) stored programs.

2. Analog computers represent data by

    a.   discrete digits.

    b.   0 and 1.

    (c.) electrical voltages.

    d.   connections on a patch-panel.

3. The components that are generally considered to be part of the computer mainframe are the

    (a.) CPU and main memory.

    b.   input and output units.

    c.   main memory and auxiliary storage.

    d.   central processor and auxiliary storage.

4. A time interval of 8 microseconds expressed as a fraction of a second would be

   a. 8/1,000.

   b. 8/10,000.

   c. 8/1,000,000.

   d. 8/1,000,000,000.

5. The _____ is equivalent to half a word.

   a. instruction

   b. byte

   c. location

   d. bit

6. A 16K memory actually consists of _____ individual memory locations.

   a. 16,000

   b. 16,096

   c. 16,384

   d. 16,896

7. Codes such as ASCII are used primarily to

   a. permit binary machines to represent alphabetic characters and decimal digits.

   b. permit computers to translate the data sent between two digital devices.

   c. prevent confidential data from being used by unauthorized personnel.

   d. convert binary information into octal notation.

8. The octal equivalent of the binary number 101011100010 is

   a. 4562.

   b. 5322.

   c. 5342.

   d. 5702.

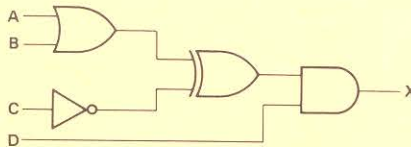9. If even parity is being used, the one binary number that contains a data error is

   a. 01011010.
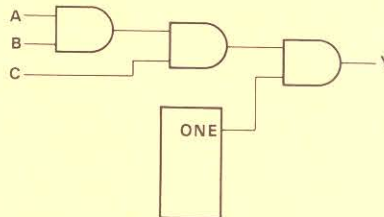
   b. 11010001.

   c. 11011010.

   d. 11011101.

10. In the circuit below, if A = 1, B = 0, C = 0, and D = 1, the value of X is

   a. 0.

   b. 1.

11. In the circuit below, if A = 1, B = 0, C = 1, and the ONE output of the flip-flop = 1, the value of Y is

   a. 0.

   b. 1.

12. The name of the small semiconductor memory used to reduce the access time of core memory for recently referenced locations is

   (a.) cache memory.

   b. interleaved memory.

   c. non-volatile memory.

   d. read-only memory.

13. The major advantage of semiconductor memory over core memory is

   a. cost.

   b. power consumption.

   (c.) speed.

   d. volatility.

14. The major advantage of core memory over semiconductor memory is

   a. cost.

   (b.) non-volatility.

   c. size.

   d. speed.

15. In flowcharting, a process to be repeated until some condition is met is represented by a

   a. branch.

   (b.) loop.

   c. hexagon.

16. An algorithm is a

    (a.) sequence of steps to be followed in reaching a solution.

    b. flowcharting technique.

    c. type of computer program.

17. The diamond-shaped flowcharting symbol represents

    a. a predefined process.

    b. initialization.

    (c.) a decision.

    d. input or output.

18. Add $101001_2 + 111011_2$.

    a. 1001100_2

    b. 1010010_2

    (c.) 1100100_2

    d. 1101100_2

19. Subtract $3421_8 - 1067_8$.

    (a.) 2332_8

    b. 2334_8

    c. 2352_8

    d. 2354_8

20. Express -74_8 in 8-bit two's complement format.

    a. 11000110

    b. 11010100

    (c.) 11000100

    d. 11100110

21. Convert 11011110 from *two's complement format* to octal.

    a. -41_8

    (b.) -42_8

    c. -136_8

    d. -137_8

22. The octal value that is stored in memory location 211 after the following program is executed is

                200   CLA
                201   ADD 210
                202   CMA
                203   IAC
                204   ADD 207
                205   STR 211
                206   HLT
                207   0614
                210   0263
                211   ????

    (a.) 0331.

    b.   0351.

    c.   0614.

    d.   1077.

23. The central processor will execute the following program loop _____ times.

                205 ADD 300
                206 ISZ 301
                207 JMP 205
                    •   •
                    •   •
                    •   •
                300 0063
                301 7771

   a.   6

   b.   7

   c.   301

   d.   7771

24. The mathematical expression that is solved when the computer executes the following program is

                200   CLA
                201   ADD 212
                202   CMA
                203   IAC
                204   STR 212
                205   ADD 211
                206   ISZ 212
                207   JMP 205
                210   HLT
                211   A
                212   B

   a.   A + B.

   b.   A * B.

   c.   A − B.

   d.   B − A.

25. When the CPU performs an ADD instruction, the two operands for the calculation are located in the

　(a.) buffer register and the accumulator.

　b. buffer register and the arithmetic-logic circuits.

　c. accumulator and the arithmetic-logic circuits.

26. The component of the CPU that points to the memory location that the CPU is currently referencing is the

　a. program counter.

　(b.) address register.

　c. buffer register.

　d. control logic.

27. The component of the CPU that performs the actual calculations is the

　a. accumulator.

　b. control logic.

　(c.) arithmetic-logic circuits.

　d. instruction decoder.

28. The peripheral device that can access information the fastest is the

　a. card reader.

　(b.) fixed-head disk unit.

　c. magnetic tape unit.

　d. moving-head disk unit.

29. The medium that can store the largest amounts of information in the smallest space is the

    a. cards.

    b. disk cartridge.

    (c.) magnetic tape.

    d. paper tape.

30. A soft copy output device commonly used in terminals is the

    a. card punch.

    (b.) display.

    c. paper tape punch.

    d. printer.

31. The element of file organization that identifies the common characteristic of members of a class is called a

    (a.) key field.

    b. character.

    c. record.

32. In a direct access file, records are inserted by

    a. reorganizing the entire file.

    (b.) reorganizing the entire index.

    c. manipulating pointer fields.

33. A binary search is used to

    a. save space.

    (b.) save computer time.

    c. eliminate addressing conflicts.

34. An advantage of the indexed sequential file organization is that it is the

    a.   most efficient in use of storage.

    b.   easiest form to update.

    (c.)   most flexible.

35. The communication path that permits addresses, data, and control information to be transferred between the computer mainframe and peripherals is (are) the

    (a.)   bus.

    b.   interface.

    c.   X-Y coordinate wires.

    d.   data control lines.

36. Of the following functions the one that is *not* performed by a typical interface is

    a.   converting parallel to serial.

    b.   interrupting programs.

    c.   addressing memory.

    (d.)   updating the instruction register.

37. The abbreviation DMA stands for the function that

    a.   permits direct addressing of memory by the CPU.

    b.   permits sharing of the bus by both memory and CPU.

    (c.)   permits large blocks of data to be transferred directly between memory and an I/O device.

    d.   permits data to be stored sequentially in memory.

38. When transmitting data in serial fashion

   (a.) one bit is transferred at a time.

   b. transmission is relatively fast.

   c. a number of lines are used.

   d. a full word is transferred at one time.

39. The high-level language statement that would convert into these assembly language instructions is

```
CLA
ADD C
ADD B
CMA
IAC
ADD A
STR X
```

   a. $X = C + B - A$.

   b. $X = A - B + C$.

   c. $X = A + B - C$.

   (d.) $X = A - (B + C)$.

40. _____ is *not* an advantage of using a symbolic language over a machine language.

   a. Increased programmer efficiency

   b. Increased self-documentation

   (c.) Increased execution efficiency

   d. Decreased chance of errors

41. Machine code is generated during

    a.   the assembler's first pass.

    (b.)   the assembler's second pass.

    c.   the assembler's third pass.

    d.   execution.

42. Of the following statements about compilers and interpreters, the one that is FALSE is:

    a.   Program development is faster with interpreters than with compilers.

    (b.)   Interpreted programs execute faster than compiled programs.

    c.   Compilers are more flexible than interpreters.

    d.   Compilers generate object code which must be linked in order to execute while interpreters generate results.

43. The assembler that allows programmers to define their own instructions is the

    a.   absolute assembler.

    b.   relocatable assembler.

    (c.)   macroassembler.

44. The high-level language that was designed specifically to express complex algebraic equations is

    a.   BASIC.

    b.   COBOL.

    (c.)   FORTRAN.

45. The I/O technique that uses a wait loop is the

(a.) programmed data transfer.

b. program interrupt data transfer.

c. DMA data transfer.

46. Of the following statements about polling and multiple interrupt levels, the one that is FALSE is:

(a.) Polling is a faster technique than using multiple interrupt levels.

b. Polling is more flexible because it uses a software table.

c. Multiple interrupt levels require more complex hardware.

d. In both techniques, the ready device with the highest priority will always be serviced next.

47. The I/O technique that is the most efficient for transferring large blocks of data is the

(a.) DMA data transfer.

b. program interrupt data transfer.

c. programmed data transfer.

48. The operating system component that performs actual data transfers is the

(a.) device handler.

b. interrupt handler.

c. library manager.

d. executive.

49. Of the following statements about batch, timesharing, and real-time systems, the one that is FALSE is:

   a. Timesharing systems service many users at terminals by executing programs in a round-robin manner.

   b. Batch systems use computer resources efficiently because programs are executed sequentially without operator intervention required between them.

   c. Real-time systems applications often include payroll, mailing lists, and inventory control.

   d. Batch systems applications are characterized by programs requiring large amounts of CPU and I/O time.

50. The operating system component that maintains a queue of programs waiting to execute is the

   a. library manager.

   b. scheduler.

   c. storage allocator.

   d. executive.