_____ 3. The procedures for updating an indexed file randomly are the same regardless of whether multiple transactions are permitted per master or only a single transaction per master is permitted.

_____ 4. The REWRITE clause may only be used with an I-0 file.

_____ 5. The INVALID KEY clause may be used with READ, WRITE, or DELETE statements.

_____ 6. A RELATIVE KEY clause is optional when reading from or writing to a relative file sequentially.

_____ 7. Relative keys must be unique.

_____ 8. The data-name specified with a RELATIVE KEY clause must be part of the relative file's record.

_____ 9. Relative keys must be entered sequentially when creating a relative file.

_____ 10. In general, accessing a relative file randomly is faster than accessing an indexed file randomly.

_____ 11. To update an employee's salary, we might use WRITE EMPLOYEE-REC after changing the salary field in EMPLOYEE-REC to the new salary.

_____ 12. One never uses the AT END clause when using indexed and relative files.

II. General Questions

1. Write the ENVIRONMENT DIVISION entries for the creation of an indexed file called MASTER-INVENTORY-FILE.

2. Write the ENVIRONMENT DIVISION entries for an indexed file called TRANS-FILE that is in transaction number sequence but will be accessed by invoice number.

3. Explain the purpose of the REWRITE statement in a COBOL program.

4. Explain the use of the INVALID KEY option. When, if ever, would AT END be used?

5. When is a file opened as I-0?

III. Validating Data

Modify the Practice Program so that it includes appropriate coding to (1) test for all errors and (2) print a control listing of totals (records processed, errors encountered, batch totals).

DEBUGGING EXERCISES

Consider the following coding:

```
PROCEDURE DIVISION.
100-MAIN-MODULE.
    OPEN INPUT TRANS-FILE
         I O INDEX-FILE
    PERFORM UNTIL THERE-ARE-NO-MORE-RECORDS
        READ TRANS-FILE
            AT END
                MOVE 'NO ' TO ARE-THERE-MORE-RECORDS
            NOT AT END
                PERFORM 200-CALC-RTN
        END-READ
    END-PERFORM
    CLOSE TRANS-FILE
          INDEX-FILE
    STOP RUN.
200-CALC-RTN.
    MOVE TRANS-NO TO DISK-TRANS-NO
    READ INDEX-FILE
        AT END MOVE 'NO ' TO ARE-THERE-MORE-INDEXED-RECORDS
    END-READ
    IF  TRANS-CODE = 'X'
        DELETE DISK-TRANS-REC
        REWRITE DISK-TRANS-REC
    END-IF
    MOVE TRANS-AMT TO DISK-AMT
    WRITE DISK-TRANS-REC
        INVALID KEY
            MOVE 'ERROR' TO MSSGE
            WRITE PRINT-REC FROM ERR-REC.
```

1. A syntax error occurs on one of the lines associated with the OPEN statement. Find and correct the error.

2. A syntax error occurs on the lines associated with READ INDEX-FILE. Find and correct the error.

3. You find that the INVALID KEY clause associated with WRITE DISK-TRANS-REC is executed incorrectly. Find and correct the error. The DELETE and REWRITE also cause syntax errors. Find and correct them.

4. After execution of the program, you print INDEX-FILE for checking purposes. You find that records which were to be deleted were not, in fact, deleted. Find and correct the error.

PROGRAMMING ASSIGNMENTS

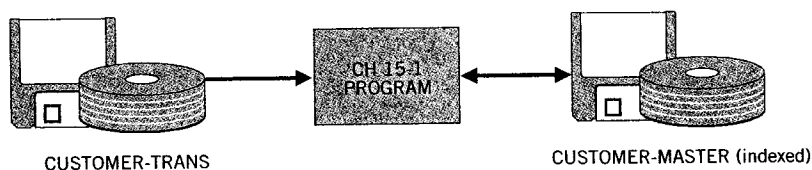Code the following programs using an indexed file.

1. Write a program to update a master indexed file. The problem definition is shown in Figure 15.16.

   Notes:
   a. Customer number is the key field for the indexed master file.
   b. If a transaction record exists for which there is no corresponding master, display it as an error.
   c. For all transaction records with corresponding master records (these are master records to be updated), add the amount of purchase from the transaction record to the amount owed in the master record and update the date of last purchase.
   d. There need not be a transaction record for each master record.
   e. Transaction records are not in sequence.

Figure 15.16 Problem definition for Programming Assignment 1.

Systems Flowchart

CUSTOMER-TRANS   CUSTOMER-MASTER (indexed)

CUSTOMER-TRANS Record Layout			
Field	**Size**	**Type**	**No. of Decimal Positions (if Numeric)**
CUSTOMER-NO	5	Alphanumeric	
CUSTOMER-NAME	20	Alphanumeric	
DATE-OF-PURCHASE	8	Date (mm/dd/yyyy)	
AMT-OF-PURCHASE	5	Numeric	2

CUSTOMER-MASTER Record Layout			
Field	**Size**	**Type**	**No. of Decimal Positions (if Numeric)**
CUSTOMER-NO	5	Alphanumeric	
CUSTOMER-NAME	20	Alphanumeric	
DATE-OF-LAST-PURCHASE	8	Date (mm/dd/yyyy)	
AMOUNT-OWED	6	Numeric	2