Operations

DDL Operations

Create a Type

```
FUNCTION createType
  GET type name from user
  OPEN system catalog
  read number of pages from system catalog header
  go to last page in system catalog
  add this type name after the last type name in last page
  update number of types in page header
  IF there is no empty slots in the last page
    create a new page
    add page number to newly created page header
    update number of pages in system catalog header
  END IF
  create a file with type name
  OPEN the file
  change usage status to active in file header
  create a new page
  add page number to newly created page header
  GET number of fields from user
  add numbers of pages and fields to file header
  FOREACH field name
    GET field names from user
    add field names to file header
  END FOREACH
  SAVE and CLOSE the file
  SAVE and CLOSE system catalog
END createType
```

Delete a Type

```
FUNCTION deleteType
  GET type name from user
  OPEN system catalog
  read number of pages from system catalog header
  FOREACH page in system catalog
    read number of types from page header
    FOREACH type name in that page
      IF type name is deleted
        shift the current type name by one type name to the left
      ELSE IF type name matches the user input
        delete this type name from system catalog
      END IF
    END FOREACH
    update number of types in page header
  END FOREACH
  IF there is no type names in the last page
    delete this page
    update number of pages in system catalog header
  END IF
  OPEN the file
  change usage status to deleted in file header
  delete all pages and records of that file
  SAVE and CLOSE the file
  SAVE and CLOSE system catalog
END deleteType
```

List all Types

```
FUNCTION listAllTypes
   GET type name from user
   OPEN system catalog
   read number of pages from system catalog header
   FOREACH page in system catalog
      read number of types from page header
      FOREACH type name in that page
         PRINT type name
      END FOREACH
   END FOREACH
   CLOSE system catalog
END listAllTypes
```

DML Operations

Create a Record

```
FUNCTION createRecord
   OPEN the file
   read number of fields from file header
   GET key field from user
   create a new record
   change usage status to active in record header
   add key field to the record
   FOREACH field except key field
      GET value from user
      add field to the record
   END FOREACH
   read number of pages from file header
   FOREACH page in that file
      read numbers of active and deleted records from page header
      FOREACH active record in that page
         IF new record is inserted
            shift the current active record by one record to the right
         ELSE IF key field of the new record is less than key field of the current active record
            insert new record before current active record
         END IF
      END FOREACH
      FOREACH deleted record in that page
         IF new record is inserted
            shift the current deleted record by one record to the right
         ELSE
            insert new record before current deleted record
         END IF
      END FOREACH
      update numbers of active and deleted records in page header
   END FOREACH
   IF new record is inserted
      insert the last shifted record
   ELSE
      insert new record
   END IF
   update numbers of active and deleted records in last page header
   IF there is no empty slots in the last page
      create a new page
      add page number to newly created page header
      update number of pages in file header
   END IF
   SAVE and CLOSE the file
END createRecord
```

Delete a Record

```
FUNCTION deleteRecord
   OPEN the file
   GET key field from user
   read number of pages from file header
   FOREACH page in that file
      read numbers of active and deleted records from page header
      FOREACH active record in that page
         IF old record is deleted
            shift the current active record by one record to the left
         ELSE IF key field of the current active record matches the user input
            extract old record
            change usage status to deleted in record header
         END IF
      END FOREACH
      FOREACH deleted record in that page
         shift the current deleted record by one record to the left
      END FOREACH
      update numbers of active and deleted records in page header
   END FOREACH
   insert old record here (end)
   update number of deleted records in last page header
   SAVE and CLOSE the file
END deleteRecord
```

Update a Record

```
FUNCTION updateRecord
   OPEN the file
   read number of fields from file header
   GET key field from user
   read number of pages from file header
   FOREACH page in that file
      read number of active records from page header
      FOREACH active record in that page
         IF key field of the current active record matches the user input
            FOREACH field except key field
               GET value from user
               add field to the record
            END FOREACH
            BREAK ALL
         END IF
      END FOREACH
   END FOREACH
   SAVE and CLOSE the file
END updateRecord
```

Search for a Record

```
FUNCTION searchRecord
  GET search operator from user
  GET searched value from user
  OPEN the file
  FOREACH page in that file
    FOREACH active record in that page
      IF search operator is <
        IF key field is less than searched value
          PRINT all fields of that record
        ELSE
          BREAK ALL
        END IF
      ELSE IF search operator is > AND key field is more than searched value
        PRINT all fields of that record
      ELSE IF search operator is = AND key field is equal to searched value
        PRINT all fields of that record
        BREAK ALL
      END IF
    END FOREACH
    IF there is a deleted record in that page
      BREAK
    END IF
  END FOREACH
  CLOSE the file
END searchRecord
```

List all Records

```
FUNCTION listAllRecords
  OPEN the file
  FOREACH page in that file
    FOREACH active record in that page
      PRINT all fields of that record
    END FOREACH
    IF there is a deleted record in that page
      BREAK
    END IF
  END FOREACH
  CLOSE the file
END listAllRecords

FUNCTION chooseDML(operation type)
  GET type name from user
  OPEN system catalog
  read number of pages from system catalog header
  FOREACH page in system catalog
    read number of types from page header
    FOREACH type name in that page
      IF type name matches the user input
        CALL the function according to the operation type
        BREAK ALL
      END IF
    END FOREACH
  END FOREACH
  CLOSE system catalog
END chooseDML
```