МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНОМУ УНІВЕРСИТЕТІ “ЛЬВІВСЬКА ПОЛІТЕХНІКА”

Кафедра систем штучного інтелекту

Лабораторна робота #2

на тему:

«Створення таблиць бази даних засобами SQL»

з дисципліни
«Організація баз даних та знань»

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Львів – 2020 р.

Мета роботи: Побудувати даталогічну модель бази даних; визначити типи, розмірності та обмеження полів; визначити обмеження таблиць; розробити SQL запити для створення спроектованих таблиць.

Хід роботи:

1. Скрипт створення бази даних:

```
-- -----------------------------------------------------

-- Set flexible strict configuration

-- -----------------------------------------------------

SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;

-- Avoid checks if values unique

SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS,
FOREIGN_KEY_CHECKS=0;

-- Avoid checks of foreign keys relations

SET @OLD_SQL_MODE=@@SQL_MODE,
SQL_MODE='ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,
NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE_SUBSTITUTION';

-- Set mode to Strict (to dates, group selects, zero deletions, engine errors)

-- -----------------------------------------------------

-- Schema mydb

-- -----------------------------------------------------

CREATE SCHEMA IF NOT EXISTS `mydb` DEFAULT CHARACTER SET utf8 ;

-- Create schema with utf8MB3 character encoding

USE `mydb` ;

-- -----------------------------------------------------

-- Table `mydb`.`office`

-- -----------------------------------------------------

CREATE TABLE IF NOT EXISTS `mydb`.`office` (

-- Create table command

    `id` INT NOT NULL AUTO_INCREMENT,

-- Create an generated id field
```

```
        `name` VARCHAR(45) NOT NULL,
        `address` VARCHAR(45) NOT NULL,
        `phone` VARCHAR(45) NOT NULL,
        `UGREOU code` INT NOT NULL,
        PRIMARY KEY (`id`),
-- Set id as primary key
        UNIQUE INDEX `office_id_UNIQUE` (`id` ASC) VISIBLE,
        UNIQUE INDEX `UGREOU code_UNIQUE` (`UGREOU code` ASC) VISIBLE)
-- Set id and UGREOU code as unique indexes sorted by ASC and VISIBLE.
ENGINE = InnoDB;
-- Set engine to InnoDB
-- -----------------------------------------------------
-- Table `mydb`.`worker`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`worker` (
          `id` INT NOT NULL AUTO_INCREMENT,
          `dateOfBirth` DATETIME NOT NULL,
          `name` VARCHAR(45) NOT NULL,
          `surname` VARCHAR(45) NOT NULL,
          `address` VARCHAR(45) NOT NULL,
          `office_id` INT NOT NULL,
          UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
          PRIMARY KEY (`id`),
          INDEX `fk_worker_office1_idx` (`office_id` ASC) VISIBLE,
  CONSTRAINT `fk_worker_office1`
            FOREIGN KEY (`office_id`)
-- Set foreign field as foreign key
            REFERENCES `mydb`.`office` (`id`)
-- Set referenced table of this FK
            ON DELETE NO ACTION
            ON UPDATE NO ACTION);
-- Do no action in case of parent object deletion or update
ENGINE = InnoDB
```

```
-- -----------------------------------------------------
-- Table `mydb`.`dealer`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`dealer` (
	`id` INT NOT NULL AUTO_INCREMENT,
	`name` VARCHAR(45) NOT NULL,
	`address` VARCHAR(45) NOT NULL,
	`phone` VARCHAR(45) NOT NULL,
	PRIMARY KEY (`id`),
	UNIQUE INDEX `dealer_id_UNIQUE` (`id` ASC) VISIBLE)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`goods`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`goods` (
	`id` INT NOT NULL AUTO_INCREMENT,
	`name` VARCHAR(45) NOT NULL,
	`price` FLOAT NOT NULL,
	`dealer_id` INT NOT NULL,
	`office_id` INT NOT NULL,
	PRIMARY KEY (`id`),
	UNIQUE INDEX `goods_id_UNIQUE` (`id` ASC) VISIBLE,
	INDEX `fk_goods_dealer1_idx` (`dealer_id` ASC) VISIBLE,
	INDEX `fk_goods_office1_idx` (`office_id` ASC) VISIBLE,
  CONSTRAINT `fk_goods_dealer1`
	  FOREIGN KEY (`dealer_id`)
	  REFERENCES `mydb`.`dealer` (`id`)
	  ON DELETE NO ACTION
	  ON UPDATE NO ACTION,
  CONSTRAINT `fk_goods_office1`
	  FOREIGN KEY (`office_id`)
	  REFERENCES `mydb`.`office` (`id`)
	  ON DELETE NO ACTION
	  ON UPDATE NO ACTION)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`client`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`client` (
	`id` INT NOT NULL AUTO_INCREMENT,
	`name` VARCHAR(45) NOT NULL,
```

```
        `surname` VARCHAR(45) NOT NULL,
        `phone` VARCHAR(45) NOT NULL,
        PRIMARY KEY (`id`),
        UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`service`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`service` (
        `id` INT NOT NULL AUTO_INCREMENT,
        `name` VARCHAR(45) NOT NULL,
        `price` VARCHAR(45) NOT NULL,
        PRIMARY KEY (`id`),
        UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`order`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`order` (
        `id` INT NOT NULL AUTO_INCREMENT,
        `start_date` DATETIME NOT NULL,
        `expire_date` DATETIME NOT NULL,
        `client_id` INT NOT NULL,
        `service_id` INT NOT NULL,
        PRIMARY KEY (`id`),
        INDEX `fk_service_client1_idx` (`client_id` ASC) VISIBLE,
        INDEX `fk_service_available_services1_idx` (`service_id` ASC) VISIBLE,
        UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
 CONSTRAINT `fk_service_client1`
        FOREIGN KEY (`client_id`)
        REFERENCES `mydb`.`client` (`id`)
        ON DELETE NO ACTION
        ON UPDATE NO ACTION,
 CONSTRAINT `fk_service_available_services1`
        FOREIGN KEY (`service_id`)
        REFERENCES `mydb`.`service` (`id`)
        ON DELETE NO ACTION
        ON UPDATE NO ACTION)
 ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`personal_tool`
```

```
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`personal_tool` (
          `id` INT NOT NULL AUTO_INCREMENT,
          `name` VARCHAR(45) NOT NULL,
          `serial_number` VARCHAR(45) NOT NULL,
          `worker_id` INT NOT NULL,
          PRIMARY KEY (`id`),
          INDEX `fk_personal_toolkit_worker1_idx` (`worker_id` ASC) VISIBLE,
          UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
  CONSTRAINT `fk_personal_toolkit_worker1`
            FOREIGN KEY (`worker_id`)
            REFERENCES `mydb`.`worker` (`id`)
            ON DELETE NO ACTION
            ON UPDATE NO ACTION)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`worker_on_service`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`worker_on_service` (
          `id` INT NOT NULL AUTO_INCREMENT,
          `worker_id` INT NOT NULL,
          `service_id` INT NOT NULL,
          PRIMARY KEY (`id`),
          INDEX `fk_worker_has_service_service1_idx` (`service_id` ASC) VISIBLE,
          INDEX `fk_worker_has_service_worker1_idx` (`worker_id` ASC) VISIBLE,
          UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
  CONSTRAINT `fk_worker_has_service_worker1`
            FOREIGN KEY (`worker_id`)
            REFERENCES `mydb`.`worker` (`id`)
            ON DELETE NO ACTION
            ON UPDATE NO ACTION,
  CONSTRAINT `fk_worker_has_service_service1`
            FOREIGN KEY (`service_id`)
            REFERENCES `mydb`.`order` (`id`)
            ON DELETE NO ACTION
            ON UPDATE NO ACTION);

ENGINE = InnoDB

-- -----------------------------------------------------
-- Table `mydb`.`purchase`
-- -----------------------------------------------------
```

```
CREATE TABLE IF NOT EXISTS `mydb`.`purchase` (
        `id` INT NOT NULL AUTO_INCREMENT,
        `client_id` INT NOT NULL,
        `goods_id` INT NOT NULL,
        `Date` DATETIME NOT NULL,
        PRIMARY KEY (`id`),
        INDEX `fk_client_has_goods_goods1_idx` (`goods_id` ASC) VISIBLE,
        INDEX `fk_client_has_goods_client1_idx` (`client_id` ASC) VISIBLE,
        UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
  CONSTRAINT `fk_client_has_goods_client1`
          FOREIGN KEY (`client_id`)
          REFERENCES `mydb`.`client` (`id`)
          ON DELETE NO ACTION
          ON UPDATE NO ACTION,
  CONSTRAINT `fk_client_has_goods_goods1`
          FOREIGN KEY (`goods_id`)
          REFERENCES `mydb`.`goods` (`id`)
          ON DELETE NO ACTION
          ON UPDATE NO ACTION)
ENGINE = InnoDB;
-- -----------------------------------------------------
-- Table `mydb`.`replaced_part`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `mydb`.`replaced_part` (
        `id` INT NOT NULL AUTO_INCREMENT,
        `worker_on_service_id` INT NOT NULL,
        `goods_id` INT NOT NULL,
        INDEX `fk_service_idx` (`worker_on_service_id` ASC) VISIBLE,
        PRIMARY KEY (`id`),
        UNIQUE INDEX `id_UNIQUE` (`id` ASC) VISIBLE,
        INDEX `fk_goods_idx` (`goods_id` ASC) VISIBLE,
  CONSTRAINT `fk_goods`
          FOREIGN KEY (`goods_id`)
          REFERENCES `mydb`.`goods` (`id`)
          ON DELETE NO ACTION
          ON UPDATE NO ACTION,
  CONSTRAINT `fk_service`
          FOREIGN KEY (`worker_on_service_id`)
          REFERENCES `mydb`.`worker_on_service` (`id`)
          ON DELETE NO ACTION
          ON UPDATE NO ACTION);
```

```
-- ----------------------------------------

-- Return to default configuration

-- ----------------------------------------

    SET SQL_MODE=@OLD_SQL_MODE;
    SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS;
    SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS;
```

2. **Продемонструвати створену скриптом базу даних.**

```
mysql> show databases
    -> ;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mydb               |
| mysql              |
| performance_schema |
| sakila             |
| sys                |
| world              |
+--------------------+
7 rows in set (0.00 sec)
```

(Тут наявні бази даних згенеровані при встановленні MySQL)

```
mysql> use mydb;
Database changed
mysql> show tables
    -> ;
+------------------+
| Tables_in_mydb   |
+------------------+
| client           |
| dealer           |
| goods            |
| office           |
| order            |
| personal_tool    |
| purchase         |
| replaced_part    |
| service          |
| worker           |
| worker_on_service |
+------------------+
11 rows in set (0.00 sec)
```

(Це всі 11 таблиць бази даних)

```
mysql> describe worker
    -> ;
+-------------+-------------+------+-----+---------+----------------+
| Field       | Type        | Null | Key | Default | Extra          |
+-------------+-------------+------+-----+---------+----------------+
| id          | int         | NO   | PRI | NULL    | auto_increment |
| dateOfBirth | datetime    | NO   |     | NULL    |                |
| name        | varchar(45) | NO   |     | NULL    |                |
| surname     | varchar(45) | NO   |     | NULL    |                |
| address     | varchar(45) | NO   |     | NULL    |                |
| office_id   | int         | NO   | MUL | NULL    |                |
+-------------+-------------+------+-----+---------+----------------+
6 rows in set (0.00 sec)
```

(Жодне поле не дозволяє значень NULL, але значень за замовчуванням не задано)

Висновок:

Виконуючи цю лабораторну роботу, я завершив моделювання бази даних з 11 таблиць та навчився з нею взаємодіяти.