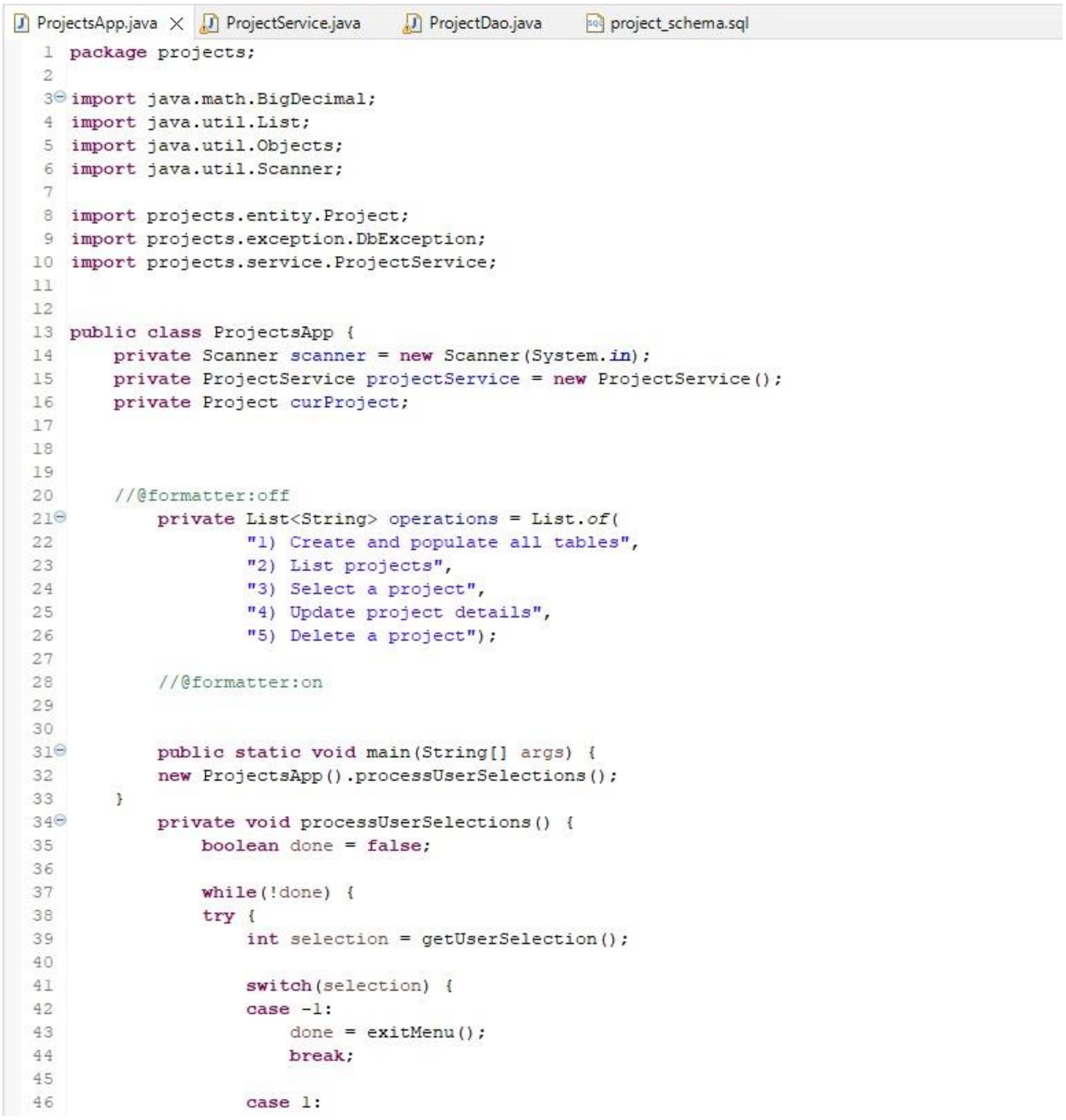
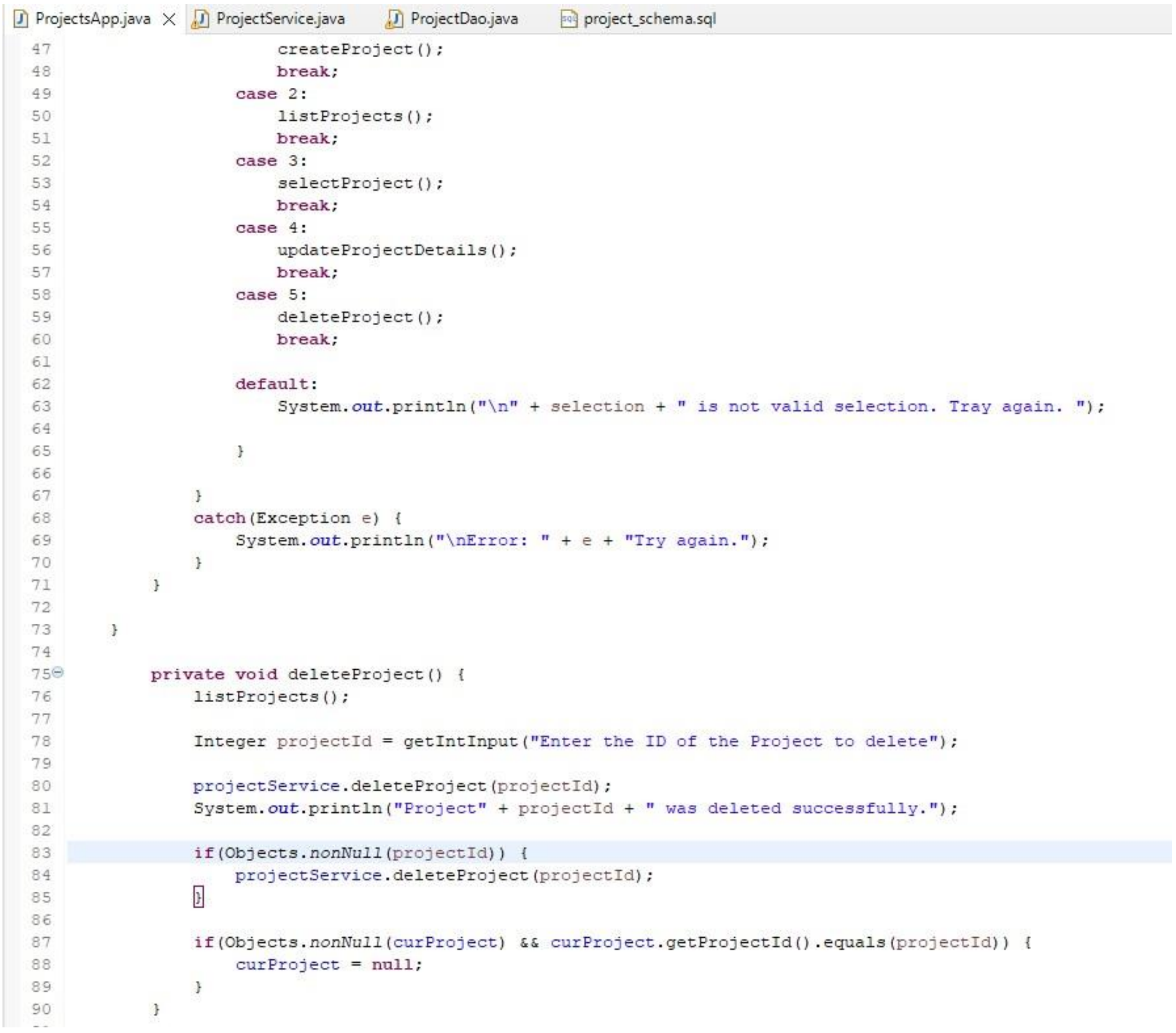
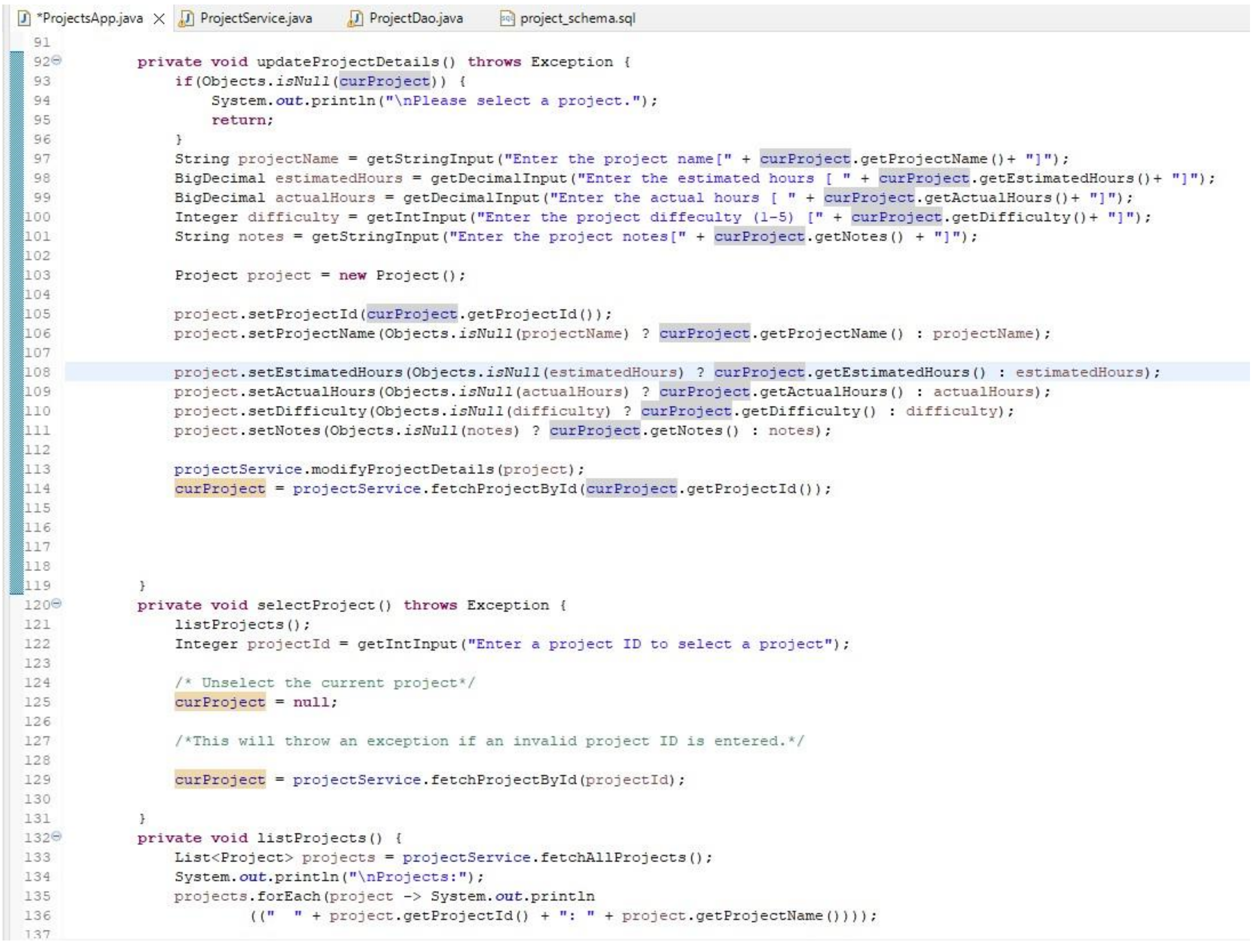

ProjectsApp.java × ProjectService.java ProjectDao.java project_schema.sql

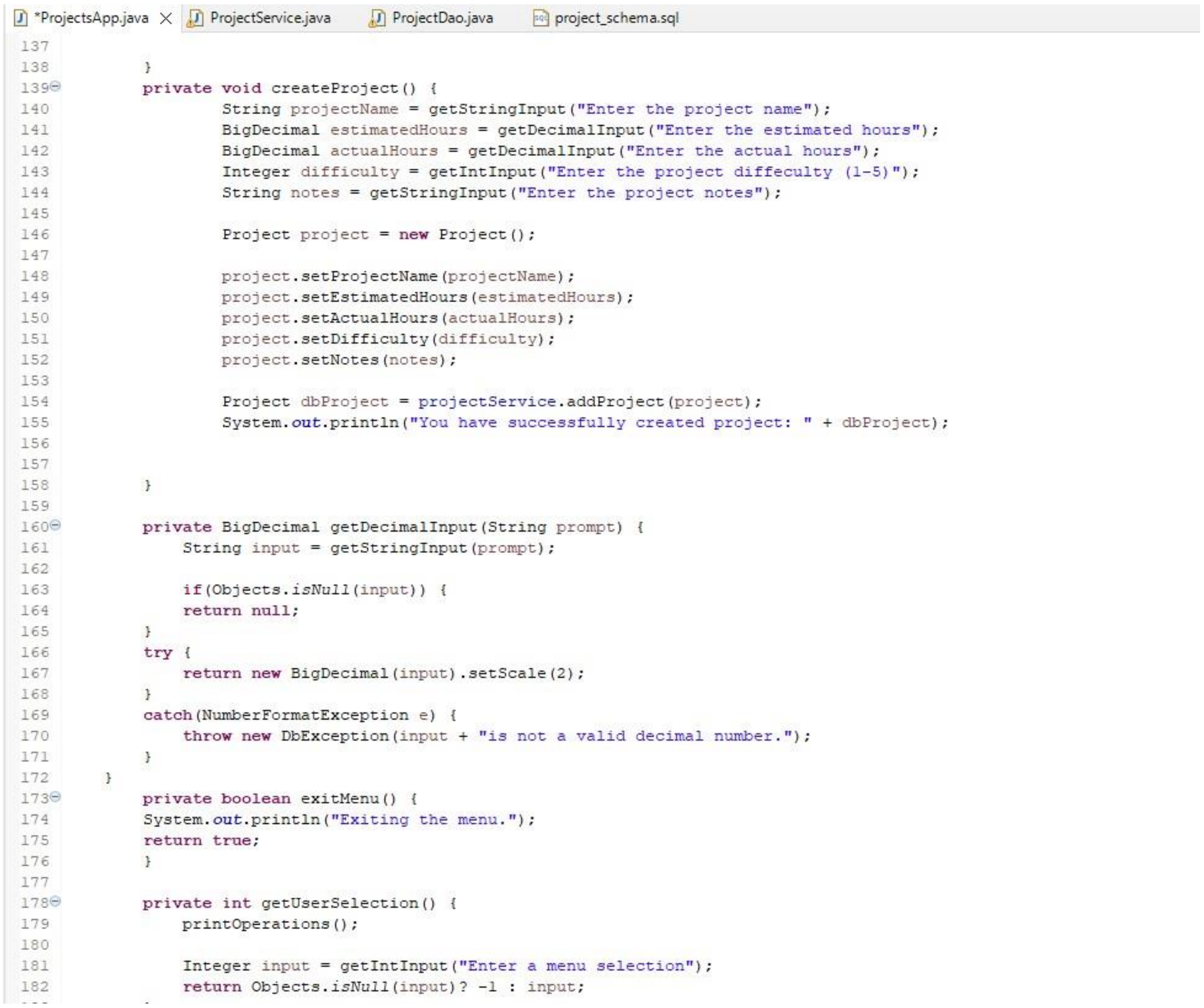
```java
package projects;

import java.math.BigDecimal;
import java.util.List;
import java.util.Objects;
import java.util.Scanner;

import projects.entity.Project;
import projects.exception.DbException;
import projects.service.ProjectService;


public class ProjectsApp {
    private Scanner scanner = new Scanner(System.in);
    private ProjectService projectService = new ProjectService();
    private Project curProject;



    //@formatter:off
        private List<String> operations = List.of(
                "1) Create and populate all tables",
                "2) List projects",
                "3) Select a project",
                "4) Update project details",
                "5) Delete a project");

        //@formatter:on


        public static void main(String[] args) {
        new ProjectsApp().processUserSelections();
    }
        private void processUserSelections() {
            boolean done = false;

            while(!done) {
            try {
                int selection = getUserSelection();

                switch(selection) {
                case -1:
                    done = exitMenu();
                    break;

                case 1:
```


ProjectsApp.java ProjectService.java ProjectDao.java project_schema.sql

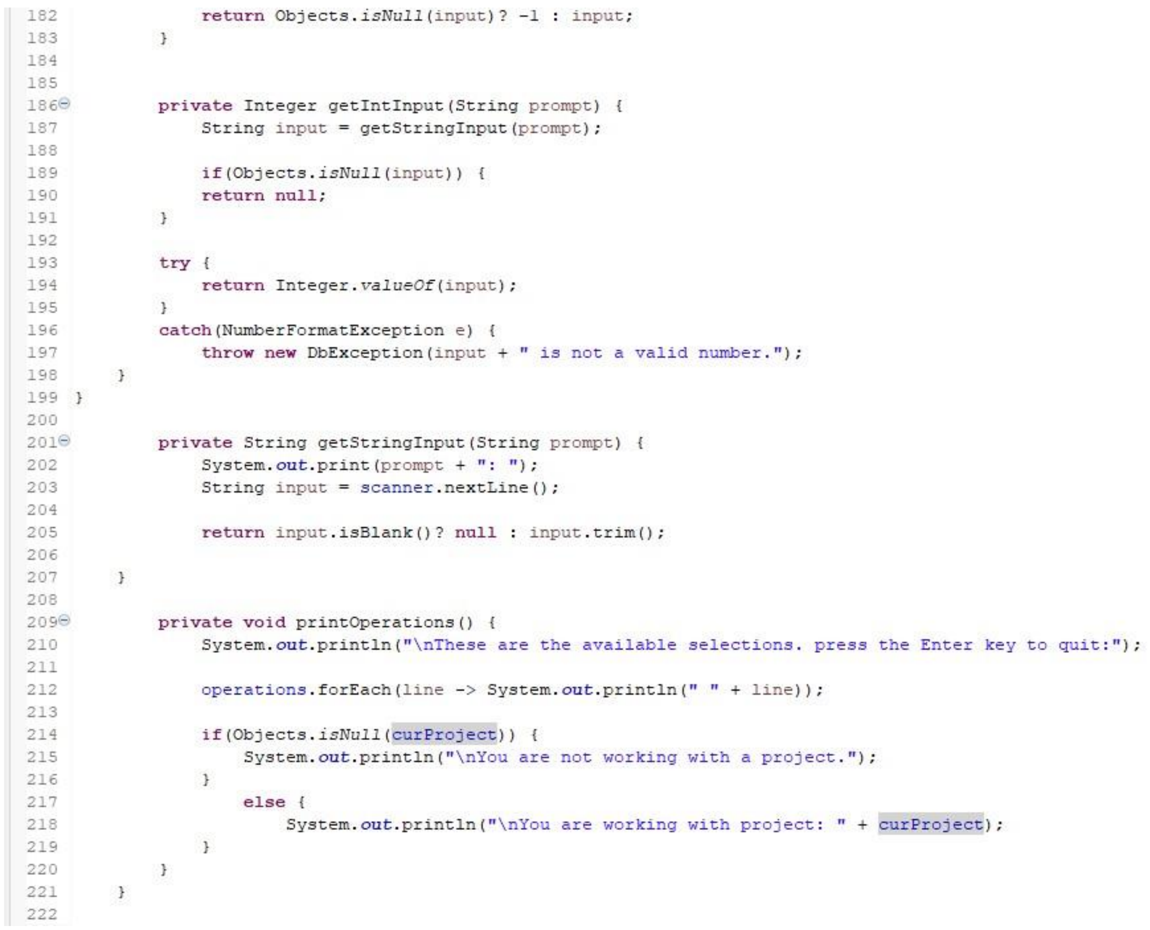
```
                    createProject();
                    break;
                case 2:
                    listProjects();
                    break;
                case 3:
                    selectProject();
                    break;
                case 4:
                    updateProjectDetails();
                    break;
                case 5:
                    deleteProject();
                    break;

                default:
                    System.out.println("\n" + selection + " is not valid selection. Tray again. ");

                }

            }
            catch(Exception e) {
                System.out.println("\nError: " + e + "Try again.");
            }
        }

    }

        private void deleteProject() {
            listProjects();

            Integer projectId = getIntInput("Enter the ID of the Project to delete");

            projectService.deleteProject(projectId);
            System.out.println("Project" + projectId + " was deleted successfully.");

            if(Objects.nonNull(projectId)) {
                projectService.deleteProject(projectId);
            }

            if(Objects.nonNull(curProject) && curProject.getProjectId().equals(projectId)) {
                curProject = null;
            }
        }
```



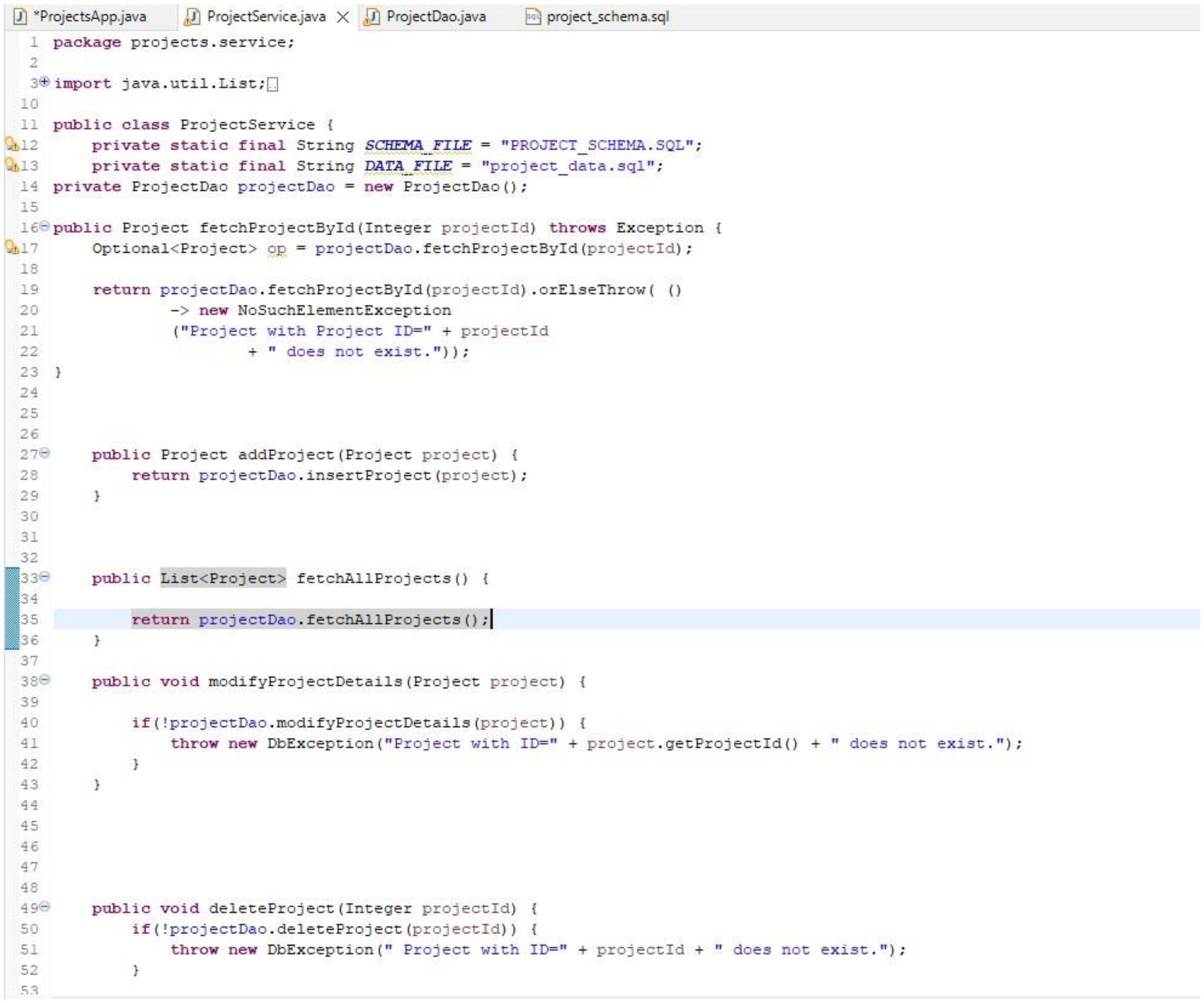
```java

    private void updateProjectDetails() throws Exception {
        if(Objects.isNull(curProject)) {
            System.out.println("\nPlease select a project.");
            return;
        }
        String projectName = getStringInput("Enter the project name[" + curProject.getProjectName()+ "]");
        BigDecimal estimatedHours = getDecimalInput("Enter the estimated hours [ " + curProject.getEstimatedHours()+ "]");
        BigDecimal actualHours = getDecimalInput("Enter the actual hours [ " + curProject.getActualHours()+ "]");
        Integer difficulty = getIntInput("Enter the project diffeculty (1-5) [" + curProject.getDifficulty()+ "]");
        String notes = getStringInput("Enter the project notes[" + curProject.getNotes() + "]");

        Project project = new Project();

        project.setProjectId(curProject.getProjectId());
        project.setProjectName(Objects.isNull(projectName) ? curProject.getProjectName() : projectName);

        project.setEstimatedHours(Objects.isNull(estimatedHours) ? curProject.getEstimatedHours() : estimatedHours);
        project.setActualHours(Objects.isNull(actualHours) ? curProject.getActualHours() : actualHours);
        project.setDifficulty(Objects.isNull(difficulty) ? curProject.getDifficulty() : difficulty);
        project.setNotes(Objects.isNull(notes) ? curProject.getNotes() : notes);

        projectService.modifyProjectDetails(project);
        curProject = projectService.fetchProjectById(curProject.getProjectId());




    }
    private void selectProject() throws Exception {
        listProjects();
        Integer projectId = getIntInput("Enter a project ID to select a project");

        /* Unselect the current project*/
        curProject = null;

        /*This will throw an exception if an invalid project ID is entered.*/

        curProject = projectService.fetchProjectById(projectId);

    }
    private void listProjects() {
        List<Project> projects = projectService.fetchAllProjects();
        System.out.println("\nProjects:");
        projects.forEach(project -> System.out.println
                (("  " + project.getProjectId() + ": " + project.getProjectName())));

```



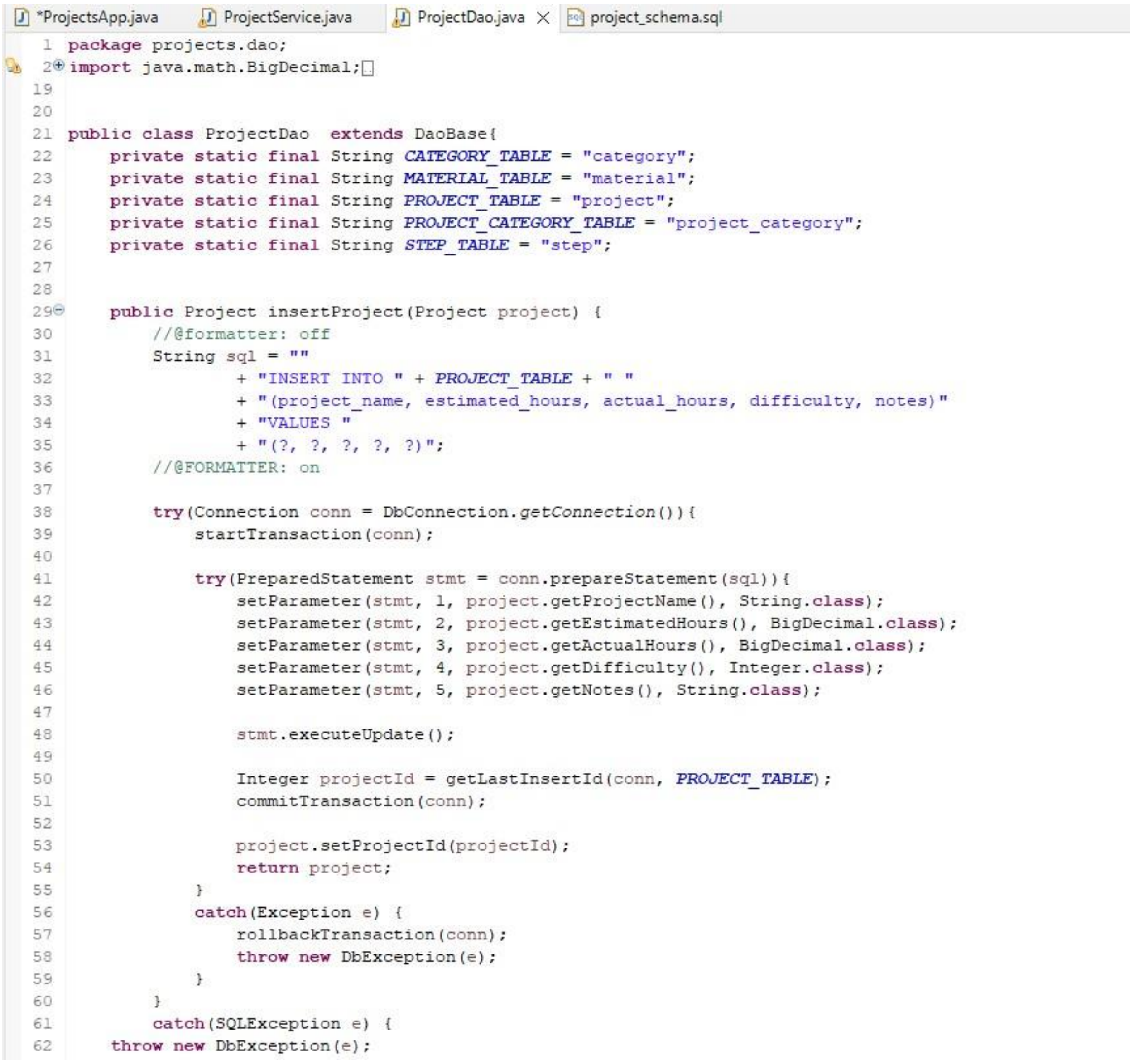
```java

        }
        private void createProject() {
                String projectName = getStringInput("Enter the project name");
                BigDecimal estimatedHours = getDecimalInput("Enter the estimated hours");
                BigDecimal actualHours = getDecimalInput("Enter the actual hours");
                Integer difficulty = getIntInput("Enter the project diffeculty (1-5)");
                String notes = getStringInput("Enter the project notes");

                Project project = new Project();

                project.setProjectName(projectName);
                project.setEstimatedHours(estimatedHours);
                project.setActualHours(actualHours);
                project.setDifficulty(difficulty);
                project.setNotes(notes);

                Project dbProject = projectService.addProject(project);
                System.out.println("You have successfully created project: " + dbProject);


        }

        private BigDecimal getDecimalInput(String prompt) {
            String input = getStringInput(prompt);

            if(Objects.isNull(input)) {
            return null;
        }
        try {
            return new BigDecimal(input).setScale(2);
        }
        catch(NumberFormatException e) {
            throw new DbException(input + "is not a valid decimal number.");
        }
    }
        private boolean exitMenu() {
        System.out.println("Exiting the menu.");
        return true;
        }

        private int getUserSelection() {
            printOperations();

            Integer input = getIntInput("Enter a menu selection");
            return Objects.isNull(input)? -1 : input;
```



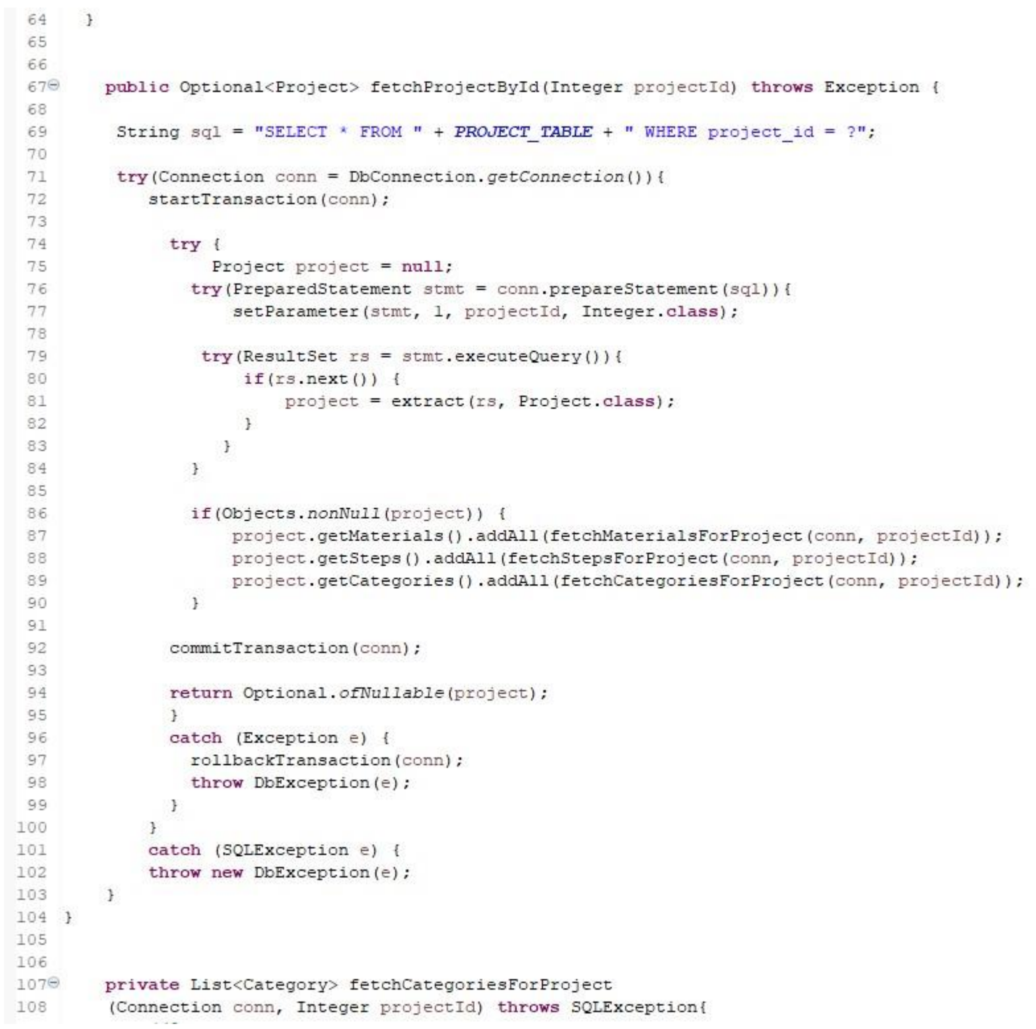
```
            return Objects.isNull(input)? -1 : input;
        }


        private Integer getIntInput(String prompt) {
            String input = getStringInput(prompt);

            if(Objects.isNull(input)) {
            return null;
        }

        try {
            return Integer.valueOf(input);
        }
        catch(NumberFormatException e) {
            throw new DbException(input + " is not a valid number.");
    }
}

        private String getStringInput(String prompt) {
            System.out.print(prompt + ": ");
            String input = scanner.nextLine();

            return input.isBlank()? null : input.trim();

    }

        private void printOperations() {
            System.out.println("\nThese are the available selections. press the Enter key to quit:");

            operations.forEach(line -> System.out.println(" " + line));

            if(Objects.isNull(curProject)) {
                System.out.println("\nYou are not working with a project.");
            }
                else {
                    System.out.println("\nYou are working with project: " + curProject);
            }
        }
    }
```



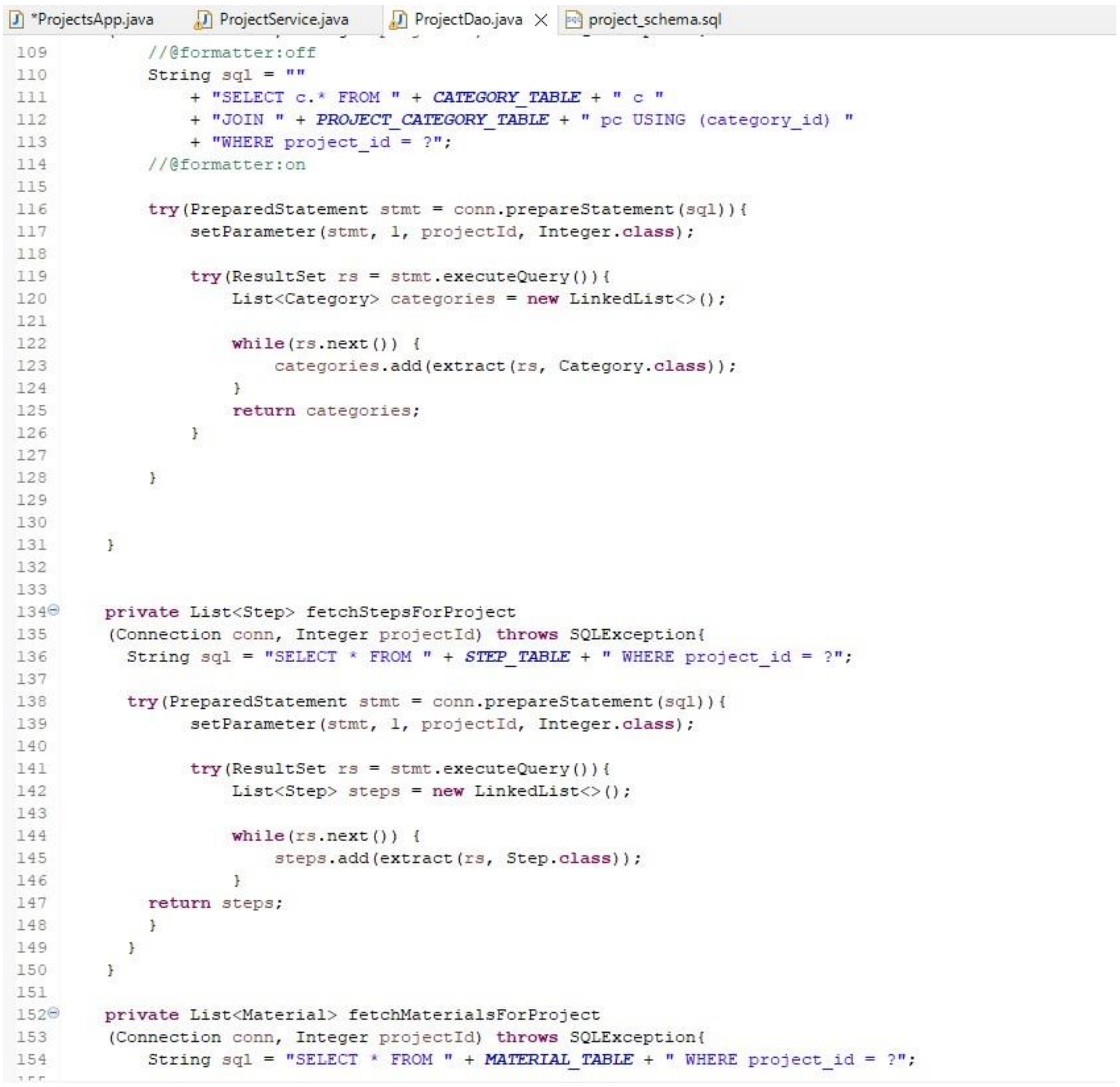
```java
package projects.service;

import java.util.List;

public class ProjectService {
    private static final String SCHEMA_FILE = "PROJECT_SCHEMA.SQL";
    private static final String DATA_FILE = "project_data.sql";
private ProjectDao projectDao = new ProjectDao();

public Project fetchProjectById(Integer projectId) throws Exception {
    Optional<Project> op = projectDao.fetchProjectById(projectId);

    return projectDao.fetchProjectById(projectId).orElseThrow( ()
            -> new NoSuchElementException
            ("Project with Project ID=" + projectId
                    + " does not exist."));
}



    public Project addProject(Project project) {
        return projectDao.insertProject(project);
    }



    public List<Project> fetchAllProjects() {

        return projectDao.fetchAllProjects();
    }

    public void modifyProjectDetails(Project project) {

        if(!projectDao.modifyProjectDetails(project)) {
            throw new DbException("Project with ID=" + project.getProjectId() + " does not exist.");
        }
    }





    public void deleteProject(Integer projectId) {
        if(!projectDao.deleteProject(projectId)) {
            throw new DbException(" Project with ID=" + projectId + " does not exist.");
        }

```



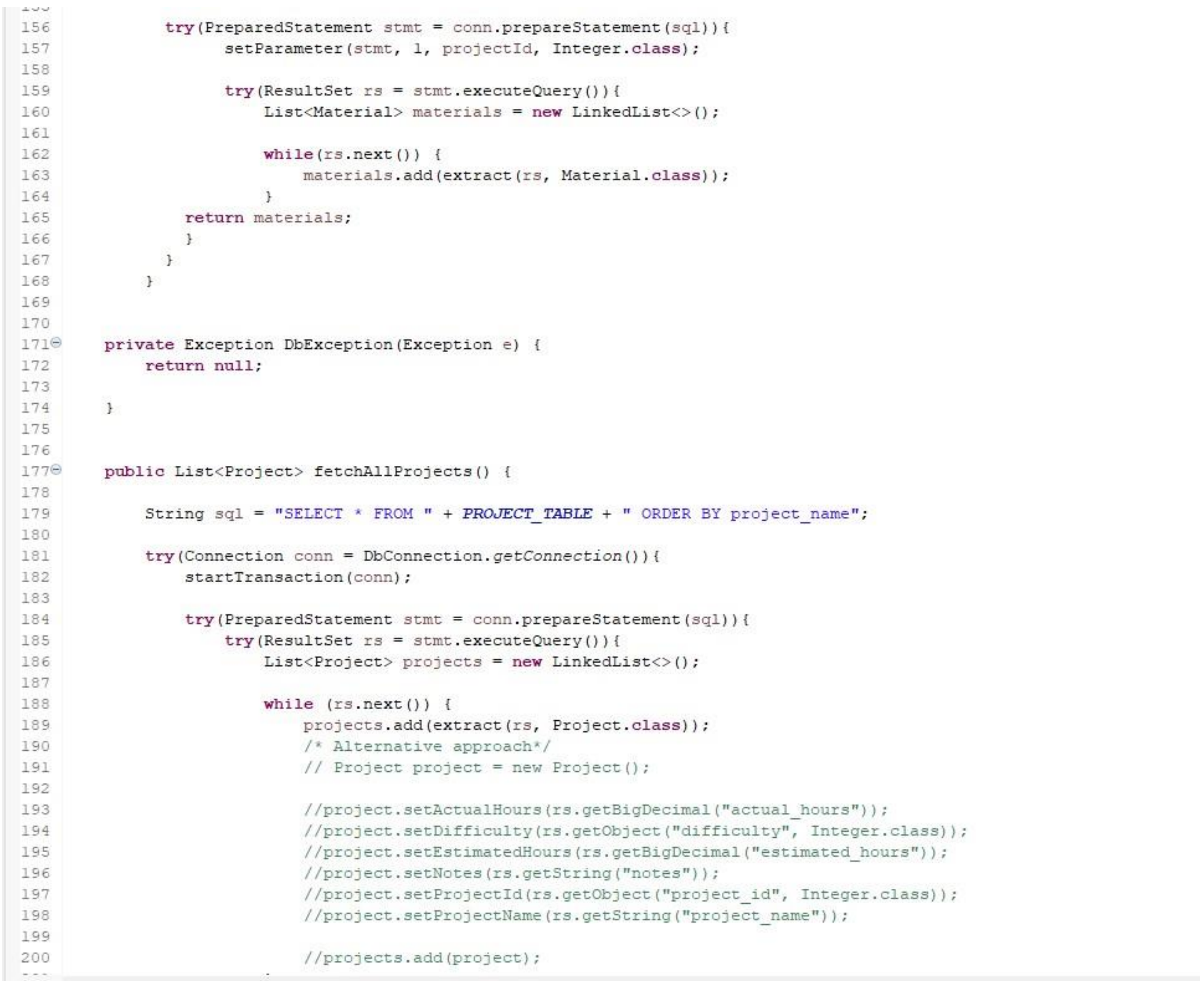
```java
package projects.dao;
import java.math.BigDecimal;


public class ProjectDao  extends DaoBase{
    private static final String CATEGORY_TABLE = "category";
    private static final String MATERIAL_TABLE = "material";
    private static final String PROJECT_TABLE = "project";
    private static final String PROJECT_CATEGORY_TABLE = "project_category";
    private static final String STEP_TABLE = "step";


    public Project insertProject(Project project) {
        //@formatter: off
        String sql = ""
                + "INSERT INTO " + PROJECT_TABLE + " "
                + "(project_name, estimated_hours, actual_hours, difficulty, notes)"
                + "VALUES "
                + "(?, ?, ?, ?, ?)";
        //@FORMATTER: on

        try(Connection conn = DbConnection.getConnection()){
            startTransaction(conn);

            try(PreparedStatement stmt = conn.prepareStatement(sql)){
                setParameter(stmt, 1, project.getProjectName(), String.class);
                setParameter(stmt, 2, project.getEstimatedHours(), BigDecimal.class);
                setParameter(stmt, 3, project.getActualHours(), BigDecimal.class);
                setParameter(stmt, 4, project.getDifficulty(), Integer.class);
                setParameter(stmt, 5, project.getNotes(), String.class);

                stmt.executeUpdate();

                Integer projectId = getLastInsertId(conn, PROJECT_TABLE);
                commitTransaction(conn);

                project.setProjectId(projectId);
                return project;
            }
            catch(Exception e) {
                rollbackTransaction(conn);
                throw new DbException(e);
            }
        }
        catch(SQLException e) {
    throw new DbException(e);
```



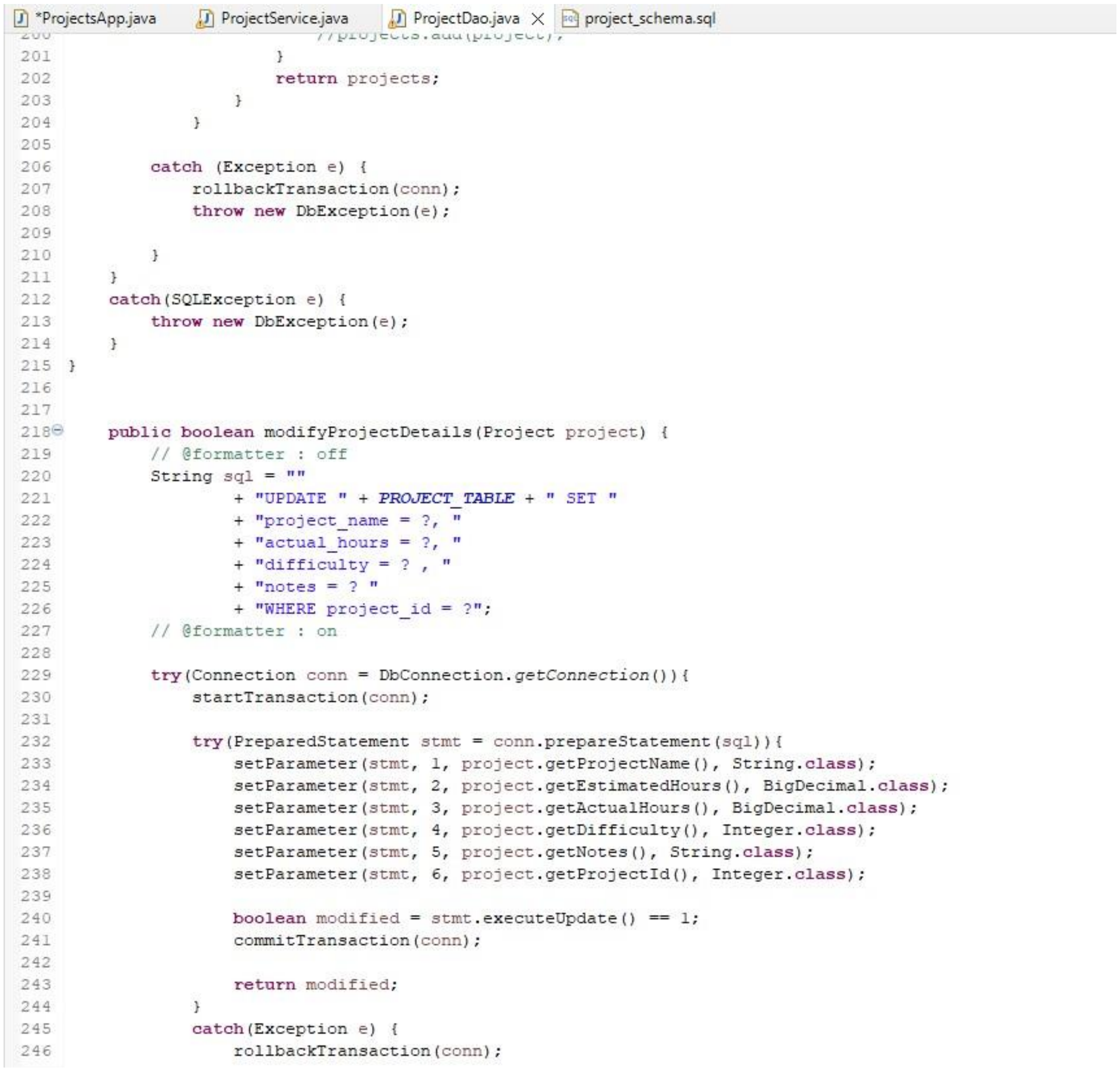
```
  }


    public Optional<Project> fetchProjectById(Integer projectId) throws Exception {

     String sql = "SELECT * FROM " + PROJECT_TABLE + " WHERE project_id = ?";

     try(Connection conn = DbConnection.getConnection()){
        startTransaction(conn);

          try {
              Project project = null;
            try(PreparedStatement stmt = conn.prepareStatement(sql)){
                setParameter(stmt, 1, projectId, Integer.class);

             try(ResultSet rs = stmt.executeQuery()){
                 if(rs.next()) {
                     project = extract(rs, Project.class);
                 }
               }
            }

            if(Objects.nonNull(project)) {
                project.getMaterials().addAll(fetchMaterialsForProject(conn, projectId));
                project.getSteps().addAll(fetchStepsForProject(conn, projectId));
                project.getCategories().addAll(fetchCategoriesForProject(conn, projectId));
            }

          commitTransaction(conn);

          return Optional.ofNullable(project);
          }
          catch (Exception e) {
            rollbackTransaction(conn);
            throw DbException(e);
          }
        }
        catch (SQLException e) {
        throw new DbException(e);
    }
}


    private List<Category> fetchCategoriesForProject
    (Connection conn, Integer projectId) throws SQLException{
```



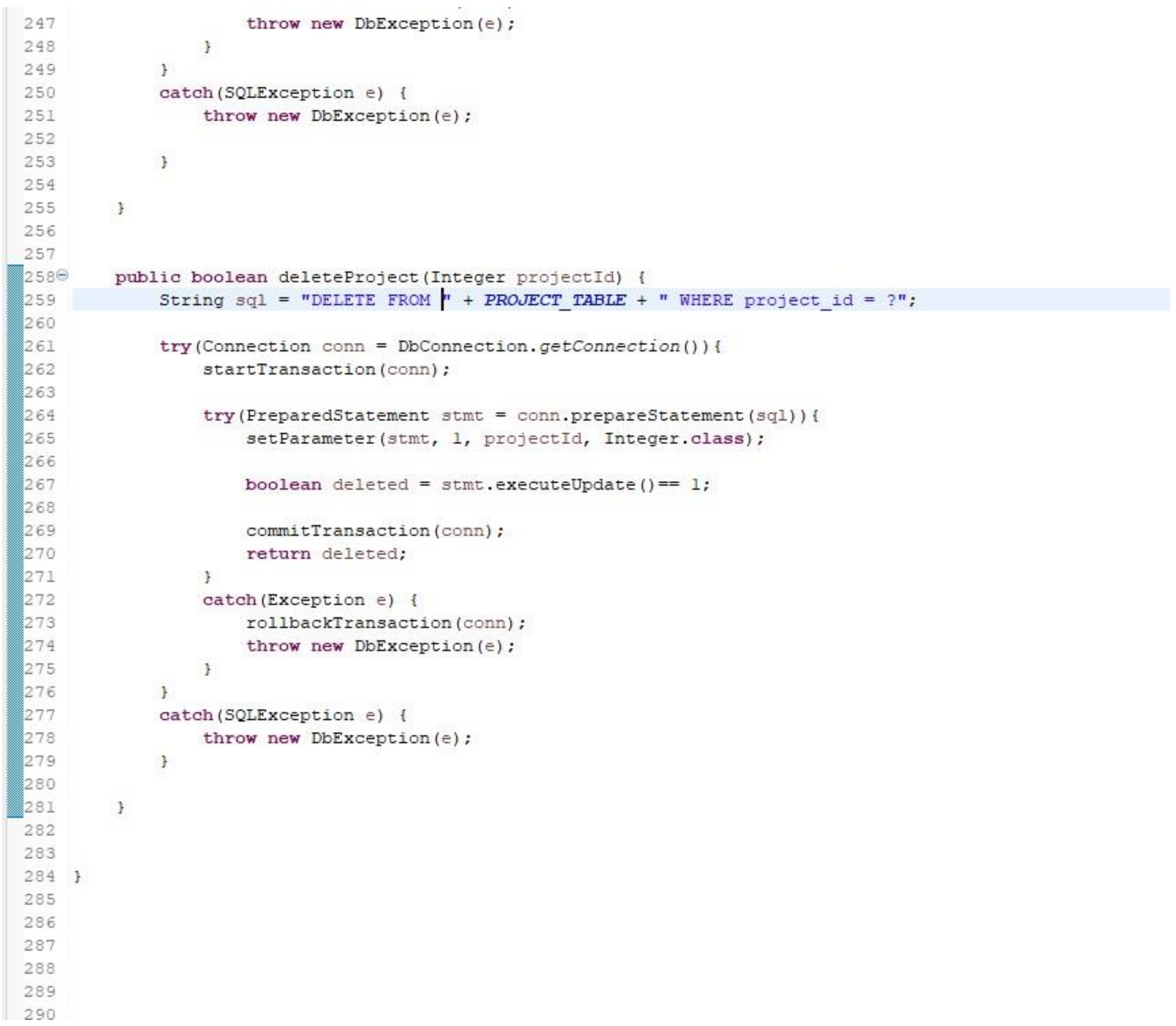
```
        //@formatter:off
        String sql = ""
            + "SELECT c.* FROM " + CATEGORY_TABLE + " c "
            + "JOIN " + PROJECT_CATEGORY_TABLE + " pc USING (category_id) "
            + "WHERE project_id = ?";
        //@formatter:on

        try(PreparedStatement stmt = conn.prepareStatement(sql)){
            setParameter(stmt, 1, projectId, Integer.class);

            try(ResultSet rs = stmt.executeQuery()){
                List<Category> categories = new LinkedList<>();

                while(rs.next()) {
                    categories.add(extract(rs, Category.class));
                }
                return categories;
            }

        }


    }


    private List<Step> fetchStepsForProject
    (Connection conn, Integer projectId) throws SQLException{
      String sql = "SELECT * FROM " + STEP_TABLE + " WHERE project_id = ?";

      try(PreparedStatement stmt = conn.prepareStatement(sql)){
            setParameter(stmt, 1, projectId, Integer.class);

            try(ResultSet rs = stmt.executeQuery()){
                List<Step> steps = new LinkedList<>();

                while(rs.next()) {
                    steps.add(extract(rs, Step.class));
                }
        return steps;
        }
      }
    }

    private List<Material> fetchMaterialsForProject
    (Connection conn, Integer projectId) throws SQLException{
        String sql = "SELECT * FROM " + MATERIAL_TABLE + " WHERE project_id = ?";
```



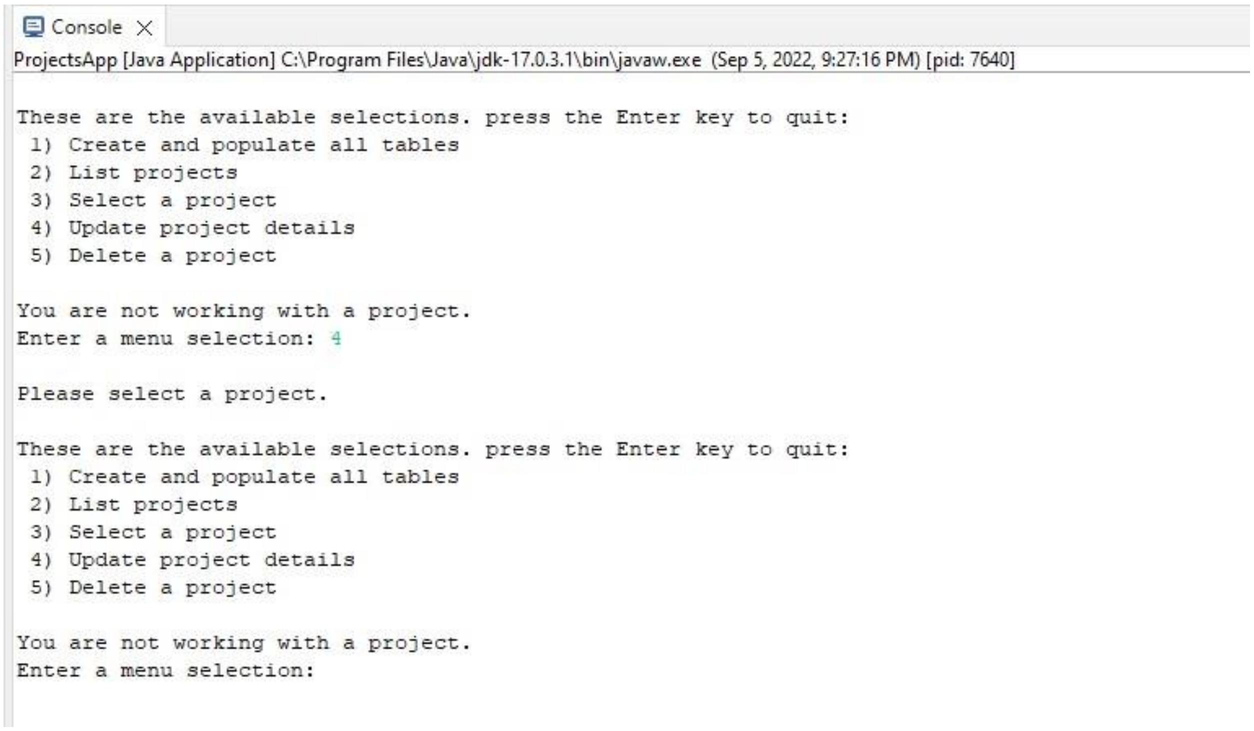
```
        try(PreparedStatement stmt = conn.prepareStatement(sql)){
            setParameter(stmt, 1, projectId, Integer.class);

            try(ResultSet rs = stmt.executeQuery()){
                List<Material> materials = new LinkedList<>();

                while(rs.next()) {
                    materials.add(extract(rs, Material.class));
                }
          return materials;
          }
        }
      }


    private Exception DbException(Exception e) {
        return null;

    }


    public List<Project> fetchAllProjects() {

        String sql = "SELECT * FROM " + PROJECT_TABLE + " ORDER BY project_name";

        try(Connection conn = DbConnection.getConnection()){
            startTransaction(conn);

            try(PreparedStatement stmt = conn.prepareStatement(sql)){
                try(ResultSet rs = stmt.executeQuery()){
                    List<Project> projects = new LinkedList<>();

                    while (rs.next()) {
                        projects.add(extract(rs, Project.class));
                        /* Alternative approach*/
                        // Project project = new Project();

                        //project.setActualHours(rs.getBigDecimal("actual_hours"));
                        //project.setDifficulty(rs.getObject("difficulty", Integer.class));
                        //project.setEstimatedHours(rs.getBigDecimal("estimated_hours"));
                        //project.setNotes(rs.getString("notes"));
                        //project.setProjectId(rs.getObject("project_id", Integer.class));
                        //project.setProjectName(rs.getString("project_name"));

                        //projects.add(project);
```



```
                        //projects.add(project);
                    }
                    return projects;
                }
            }

        catch (Exception e) {
            rollbackTransaction(conn);
            throw new DbException(e);

        }
    }
    catch(SQLException e) {
        throw new DbException(e);
    }
}


    public boolean modifyProjectDetails(Project project) {
        // @formatter : off
        String sql = ""
                + "UPDATE " + PROJECT_TABLE + " SET "
                + "project_name = ?, "
                + "actual_hours = ?, "
                + "difficulty = ? , "
                + "notes = ? "
                + "WHERE project_id = ?";
        // @formatter : on

        try(Connection conn = DbConnection.getConnection()){
            startTransaction(conn);

            try(PreparedStatement stmt = conn.prepareStatement(sql)){
                setParameter(stmt, 1, project.getProjectName(), String.class);
                setParameter(stmt, 2, project.getEstimatedHours(), BigDecimal.class);
                setParameter(stmt, 3, project.getActualHours(), BigDecimal.class);
                setParameter(stmt, 4, project.getDifficulty(), Integer.class);
                setParameter(stmt, 5, project.getNotes(), String.class);
                setParameter(stmt, 6, project.getProjectId(), Integer.class);

                boolean modified = stmt.executeUpdate() == 1;
                commitTransaction(conn);

                return modified;
            }
            catch(Exception e) {
                rollbackTransaction(conn);
```



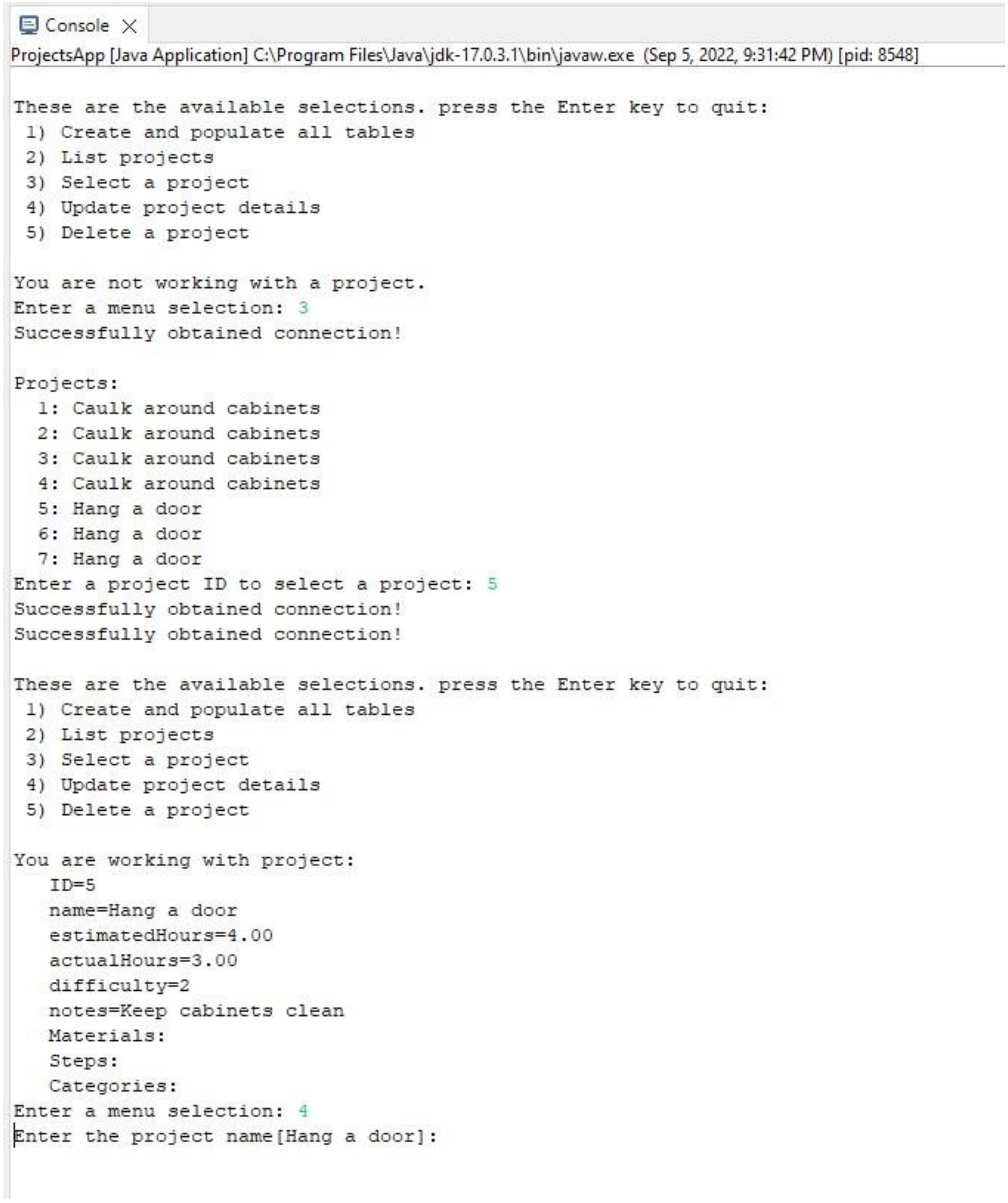
```java
                throw new DbException(e);
            }
        }
        catch(SQLException e) {
            throw new DbException(e);

        }

    }


    public boolean deleteProject(Integer projectId) {
        String sql = "DELETE FROM " + PROJECT_TABLE + " WHERE project_id = ?";

        try(Connection conn = DbConnection.getConnection()){
            startTransaction(conn);

            try(PreparedStatement stmt = conn.prepareStatement(sql)){
                setParameter(stmt, 1, projectId, Integer.class);

                boolean deleted = stmt.executeUpdate()== 1;

                commitTransaction(conn);
                return deleted;
            }
            catch(Exception e) {
                rollbackTransaction(conn);
                throw new DbException(e);
            }
        }
        catch(SQLException e) {
            throw new DbException(e);
        }

    }


}
```



Console

ProjectsApp [Java Application] C:\Program Files\Java\jdk-17.0.3.1\bin\javaw.exe (Sep 5, 2022, 9:27:16 PM) [pid: 7640]

```
These are the available selections. press the Enter key to quit:
 1) Create and populate all tables
 2) List projects
 3) Select a project
 4) Update project details
 5) Delete a project

You are not working with a project.
Enter a menu selection: 4

Please select a project.

These are the available selections. press the Enter key to quit:
 1) Create and populate all tables
 2) List projects
 3) Select a project
 4) Update project details
 5) Delete a project

You are not working with a project.
Enter a menu selection:
```



Console

```
ProjectsApp [Java Application] C:\Program Files\Java\jdk-17.0.3.1\bin\javaw.exe (Sep 5, 2022, 9:31:42 PM) [pid: 8548]

These are the available selections. press the Enter key to quit:
 1) Create and populate all tables
 2) List projects
 3) Select a project
 4) Update project details
 5) Delete a project

You are not working with a project.
Enter a menu selection: 3
Successfully obtained connection!

Projects:
  1: Caulk around cabinets
  2: Caulk around cabinets
  3: Caulk around cabinets
  4: Caulk around cabinets
  5: Hang a door
  6: Hang a door
  7: Hang a door
Enter a project ID to select a project: 5
Successfully obtained connection!
Successfully obtained connection!

These are the available selections. press the Enter key to quit:
 1) Create and populate all tables
 2) List projects
 3) Select a project
 4) Update project details
 5) Delete a project

You are working with project:
   ID=5
   name=Hang a door
   estimatedHours=4.00
   actualHours=3.00
   difficulty=2
   notes=Keep cabinets clean
   Materials:
   Steps:
   Categories:
Enter a menu selection: 4
Enter the project name[Hang a door]:
```

https://github.com/bmason1969/Week-11.git