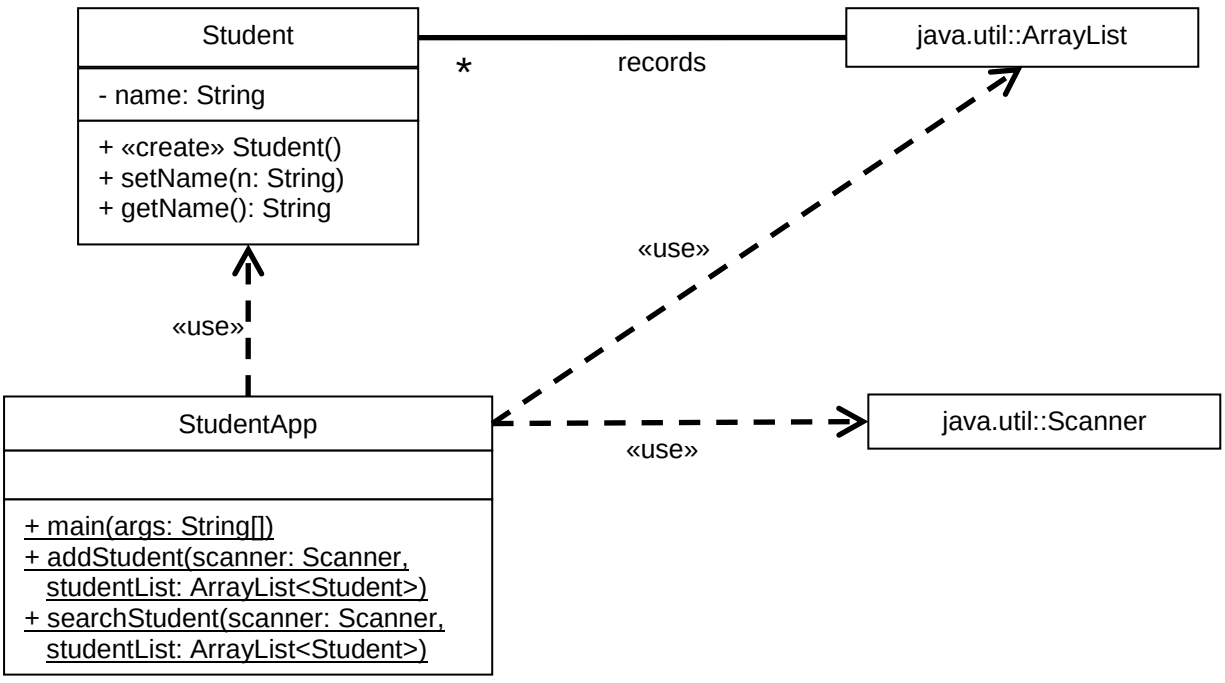
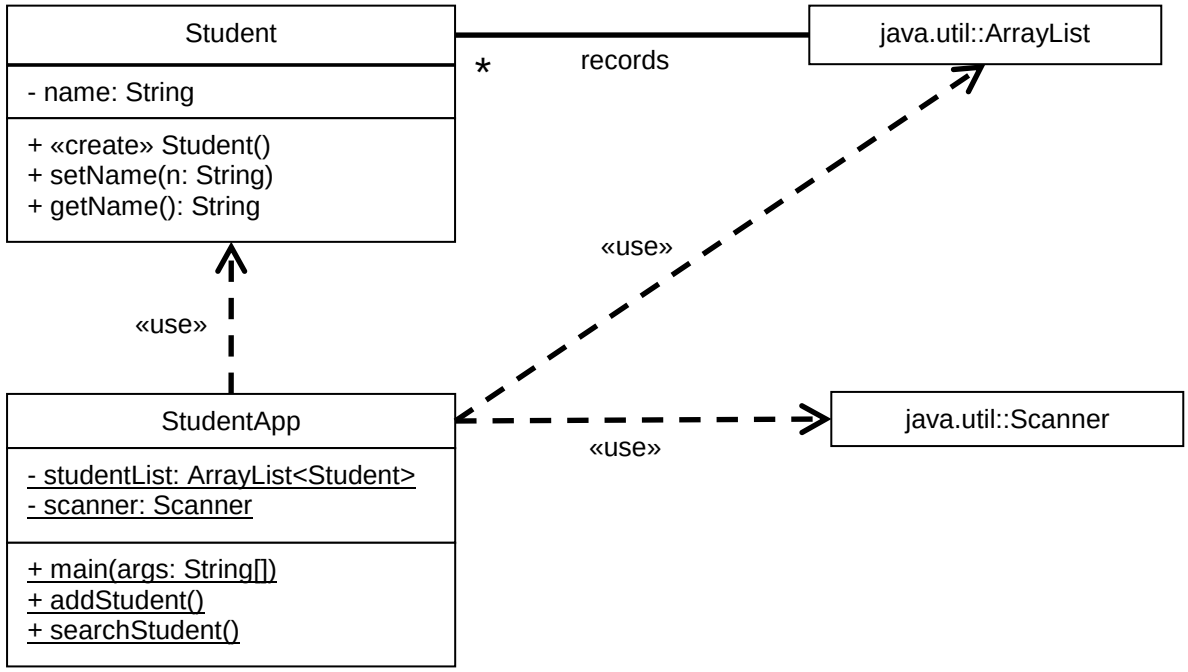
UECS2344 Software Design: Lecture 2 - Exercise 1 Answer

```
// ArrayList and Scanner objects are local variables of main

public class StudentApp {

    public static void main(String[] args) {

        ArrayList<Student> studentList = new ArrayList<Student>();
        Scanner scanner = new Scanner(System.in);
        . . .
             switch(choice) {
                  case 1: addStudent(studentList, scanner); break;
                  case 2: searchStudent(studentList, scanner); break;
                  default: break;
             }
        . . .

    }

    public static void addStudent(Scanner scanner,
                                  ArrayList<Student> studentList) {
        . . .
    }

    public static void searchStudent(Scanner scanner,
                                  ArrayList<Student> studentList) {
        . . .
    }
}
```



```java
// Revised Design
// – make ArrayList and Scanner objects as static variables of class

public class StudentApp {

    private static ArrayList<Student> studentList;
    private static Scanner scanner;

    public static void main(String[] args) {
        studentList = new ArrayList<Student>();
        scanner = new Scanner(System.in);
        . . .
             switch(choice) {
                  case 1: addStudent(); break;
                  case 2: searchStudent(); break;
                  default: break;
             }
        . . .
    }

    public static void addStudent() {
        . . .
    }

    public static void searchStudent() {
        . . .
    }
}
```



Code for Searching

```
// Version 1 – incorrect and badly designed

ArrayList<String> letters = new ArrayList<String>();

letters.add("G");
letters.add("T");
letters.add("H");
letters.add("B");
// some other processing

int count = letters.size();
if (count == 0) {
      System.out.println("No letters to process");
} else {
      System.out.print("Enter letter to process: ");
      String theLetter = scanner.nextLine();

      // search for user-specified letter and
      //   if found, convert it to upper or lowercase
      int i = 0;
      String aLetter = null;
      while (i < count) {
            aLetter = letters.get(i);
            if ( aLetter.equals(theLetter) ) {
                System.out.println("Do you change to:");
                System.out.println("1. Lowercase");
                System.out.println("2. Uppercase");
                System.out.print("Enter your choice: ");
                int choice = scanner.nextInt();
                // read the enter key after integer input
                String skip = scanner.nextLine();

                if (choice == 1)
                     letters.set(i, aLetter.toLowerCase());
                else if (choice == 2)
                     letters.set(i, aLetter.toUpperCase());
            } else {
                  i++;
            }
      }
}
```

```java
// Version 2 – correct and better design (more readable / maintainable)

ArrayList<String> letters = new ArrayList<String>();

letters.add("G");
letters.add("T");
letters.add("H");
letters.add("B");
// some other processing

int count = letters.size();
if (count == 0) {
      System.out.println("No letters to process");
} else {
      System.out.print("Enter letter to process: ");
      String theLetter = scanner.nextLine();

     // search for user-specified letter
      boolean found = false;
      int i = 0;
      String aLetter = null;
      while (i < count && !found ) {
            aLetter = letters.get(i);
           if ( aLetter.equals(theLetter) )
                 found = true;
           else
                 i++;
      }

      // if found, convert the letter to upper or lower case
      if (found){
          System.out.println("Do you change to:");
          System.out.println("1. Lowercase");
          System.out.println("2. Uppercase");
          System.out.print("Enter your choice: ");
          int choice = scanner.nextInt();
          // read the enter key after integer input
          String skip = scanner.nextLine();

          if (choice == 1)
               letters.set(i, aLetter.toLowerCase());
          else if (choice == 2)
               letters.set(i, aLetter.toUpperCase());
      }
}
```