IMPLEMENTING DIFFERENT SET OPERATIONS

PROBLEM STATEMENT

1. An input a list of strings as a Universe.
2. Then takes another input a number of sets (that are subsets of the universe)
3. Then ask the user about the operations they want to perform (3 required features to be implemented in this assignment):
    - Union of two sets
    - Intersection of two sets
    - Complement of a set

USED DATA STRUCTURES

- Character Array
- String Array

PSEUDOCODE

Scan the universe set
Put them in an array
Calculate the size
Make a string array called numbers to know which element is in which
Scan the number of subsets
    if zero catch error
Scan each subset
    if element doesn't exist in universe catch error
Order the elements in order of universe
Using the numbers of each set we add in the numbers array the value of it in the corresponding position
Print out the options that the user can choose from and scan it
Union:
    choosing the two sets that the user wants to union

checking in the numbers array for each cell that contain the name of either one of the 2 sets for the union

print

Intersection:

Choosing 2 sets

checking the numbers array to see if each element in it have the same value

if same value then this element are in both sets

print

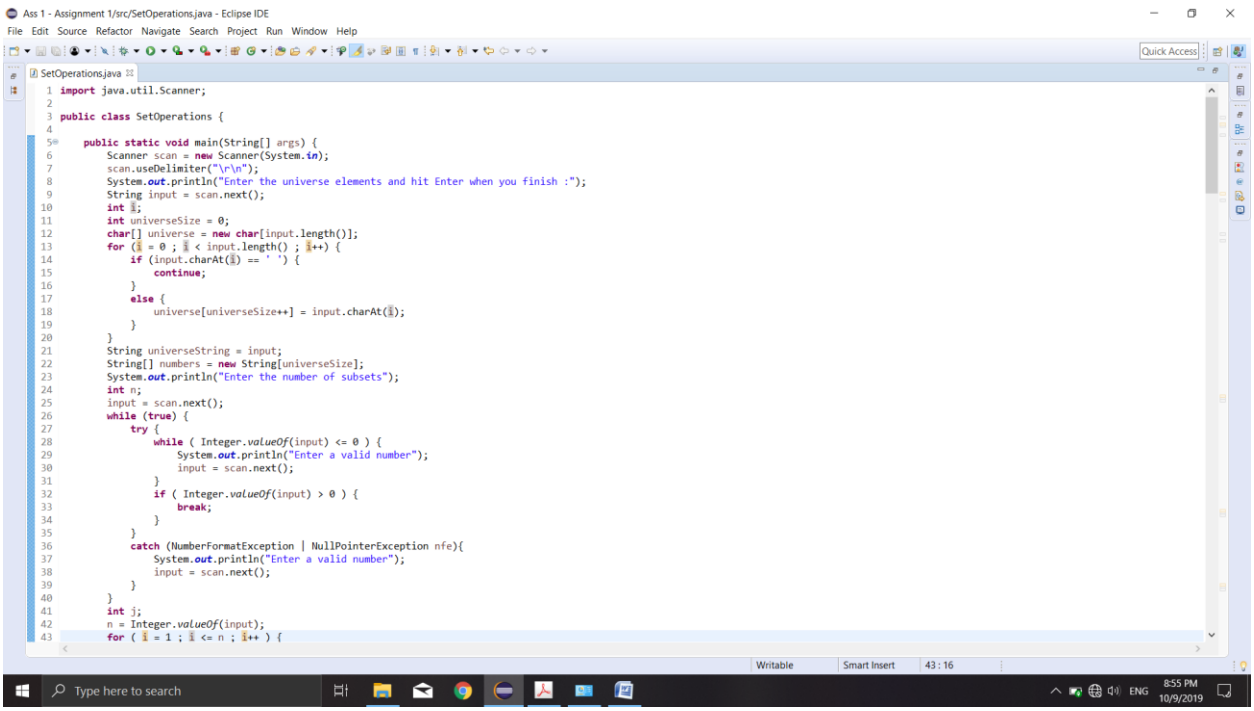
Complement:

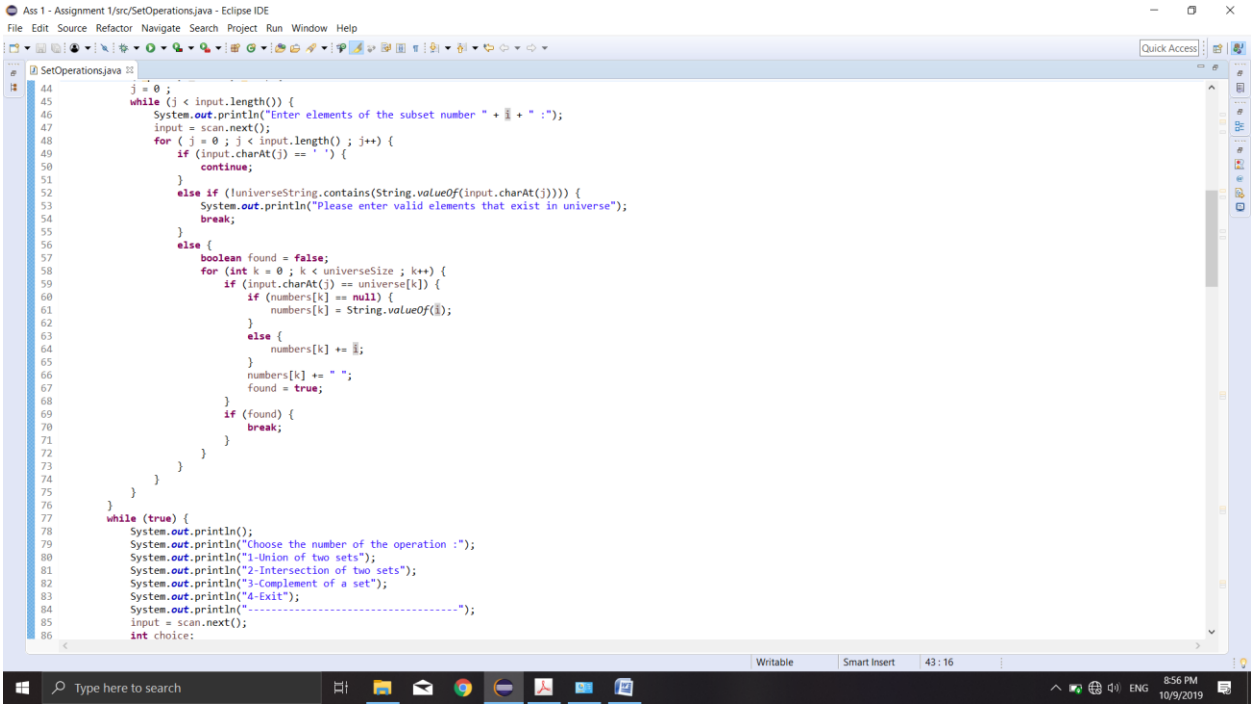
choosing the set

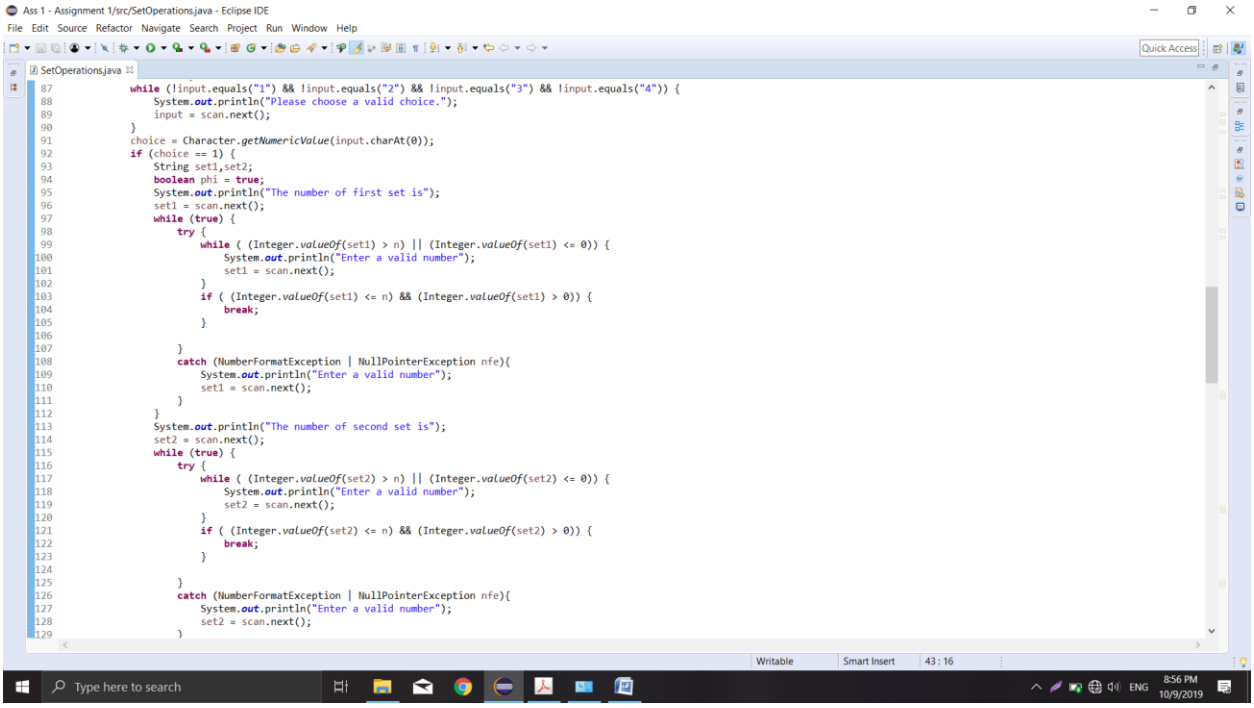
checking the universe array and the numbers array

if the numbers array element is in the universe we skip it and only print the ones that are not in the selected array

CODE SNIPPETS




Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
SetOperations.java
j = 0 ;
while (j < input.length()) {
System.out.println("Enter elements of the subset number " + i + " :");
input = scan.next();
for (j = 0 ; j < input.length() ; j++) {
if (input.charAt(j) == ' ') {
continue;
}
else if (!universeString.contains(String.valueOf(input.charAt(j)))) {
System.out.println("Please enter valid elements that exist in universe");
break;
}
else {
boolean found = false;
for (int k = 0 ; k < universeSize ; k++) {
if (input.charAt(j) == universe[k]) {
if (numbers[k] == null) {
numbers[k] = String.valueOf(i);
}
else {
numbers[k] += i;
}
numbers[k] += " ";
found = true;
}
if (found) {
break;
}
}
}
}
}
}
while (true) {
System.out.println();
System.out.println("Choose the number of the operation :");
System.out.println("1-Union of two sets");
System.out.println("2-Intersection of two sets");
System.out.println("3-Complement of a set");
System.out.println("4-Exit");
System.out.println("-----------------------------------");
input = scan.next();
int choice;
Writable
Smart Insert
43 : 16
Type here to search
ENG
8:56 PM
10/9/2019


Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
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SetOperations.java
while (!input.equals("1") && !input.equals("2") && !input.equals("3") && !input.equals("4")) {
System.out.println("Please choose a valid choice.");
input = scan.next();
}
choice = Character.getNumericValue(input.charAt(0));
if (choice == 1) {
String set1,set2;
boolean phi = true;
System.out.println("The number of first set is");
set1 = scan.next();
while (true) {
try {
while ((Integer.valueOf(set1) > n) || (Integer.valueOf(set1) <= 0)) {
System.out.println("Enter a valid number");
set1 = scan.next();
}
if ((Integer.valueOf(set1) <= n) && (Integer.valueOf(set1) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set1 = scan.next();
}
}
System.out.println("The number of second set is");
set2 = scan.next();
while (true) {
try {
while ((Integer.valueOf(set2) > n) || (Integer.valueOf(set2) <= 0)) {
System.out.println("Enter a valid number");
set2 = scan.next();
}
if ((Integer.valueOf(set2) <= n) && (Integer.valueOf(set2) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set2 = scan.next();
}
Writable
Smart Insert
43 : 16
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ENG
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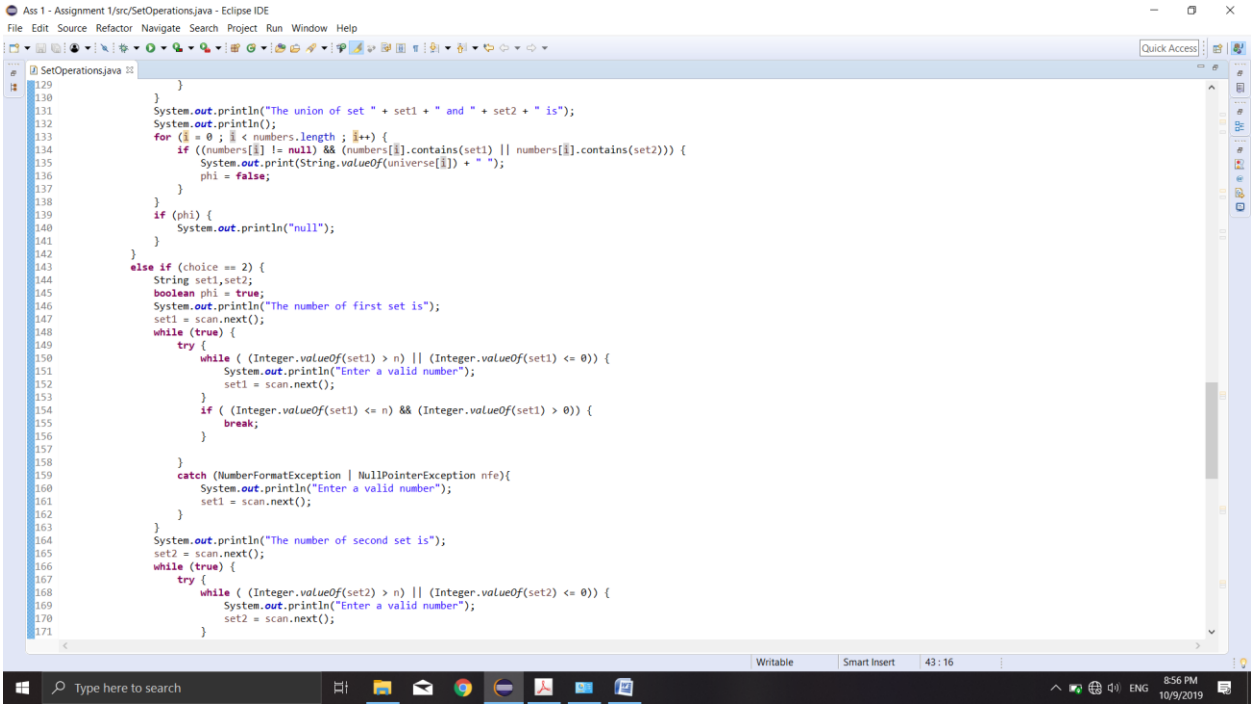
10/9/2019


Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
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Quick Access
SetOperations.java
}
}
System.out.println("The union of set " + set1 + " and " + set2 + " is");
System.out.println();
for (i = 0 ; i < numbers.length ; i++) {
if ((numbers[i] != null) && (numbers[i].contains(set1) || numbers[i].contains(set2))) {
System.out.print(String.valueOf(universe[i]) + " ");
phi = false;
}
}
if (phi) {
System.out.println("null");
}
}
else if (choice == 2) {
String set1,set2;
boolean phi = true;
System.out.println("The number of first set is");
set1 = scan.next();
while (true) {
try {
while ((Integer.valueOf(set1) > n) || (Integer.valueOf(set1) <= 0)) {
System.out.println("Enter a valid number");
set1 = scan.next();
}
if ((Integer.valueOf(set1) <= n) && (Integer.valueOf(set1) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set1 = scan.next();
}
}
System.out.println("The number of second set is");
set2 = scan.next();
while (true) {
try {
while ((Integer.valueOf(set2) > n) || (Integer.valueOf(set2) <= 0)) {
System.out.println("Enter a valid number");
set2 = scan.next();
}
Writable
Smart Insert
43 : 16
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ENG
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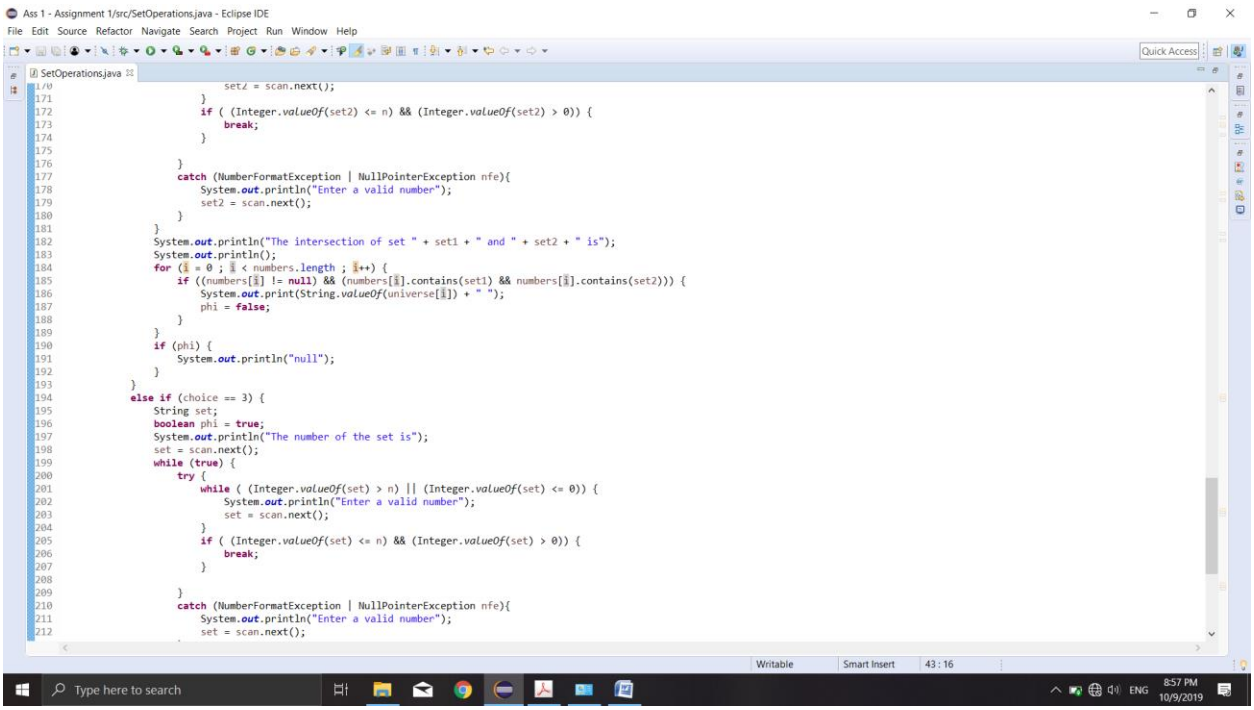
10/9/2019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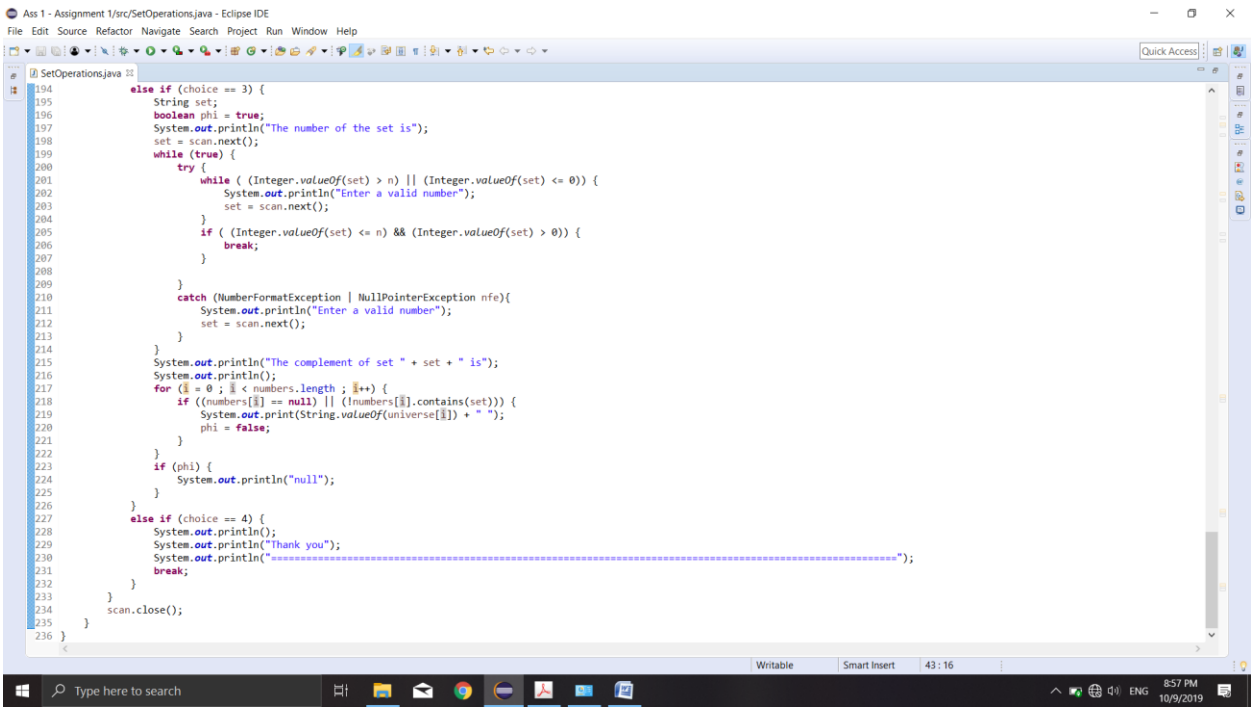
SetOperations.java
set2 = scan.next();
}
if ((Integer.valueOf(set2) <= n) && (Integer.valueOf(set2) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set2 = scan.next();
}
}
System.out.println("The intersection of set " + set1 + " and " + set2 + " is");
System.out.println();
for (i = 0 ; i < numbers.length ; i++) {
if ((numbers[i] != null) && (numbers[i].contains(set1) && numbers[i].contains(set2))) {
System.out.print(String.valueOf(universe[i]) + " ");
phi = false;
}
}
if (phi) {
System.out.println("null");
}
}
else if (choice == 3) {
String set;
boolean phi = true;
System.out.println("The number of the set is");
set = scan.next();
while (true) {
try {
while ((Integer.valueOf(set) > n) || (Integer.valueOf(set) <= 0)) {
System.out.println("Enter a valid number");
set = scan.next();
}
if ((Integer.valueOf(set) <= n) && (Integer.valueOf(set) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set = scan.next();
Writable
Smart Insert
43 : 16
Type here to search
ENG
8:57 PM
10/9/2019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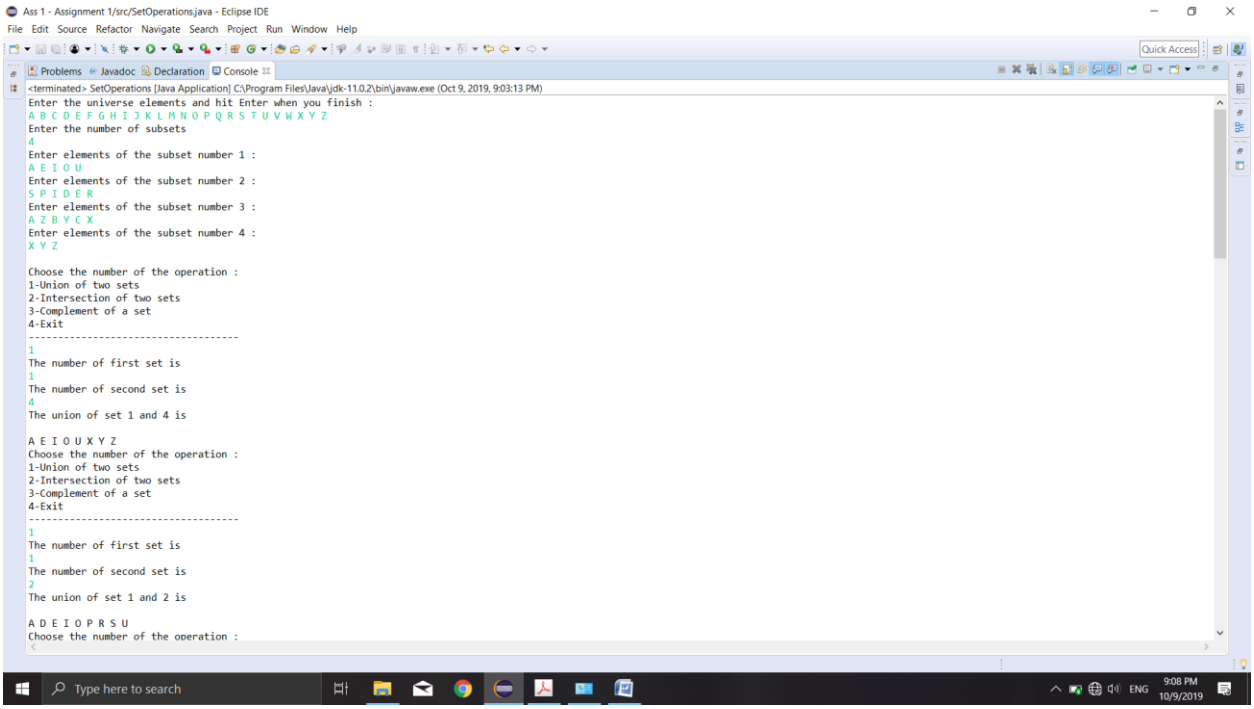
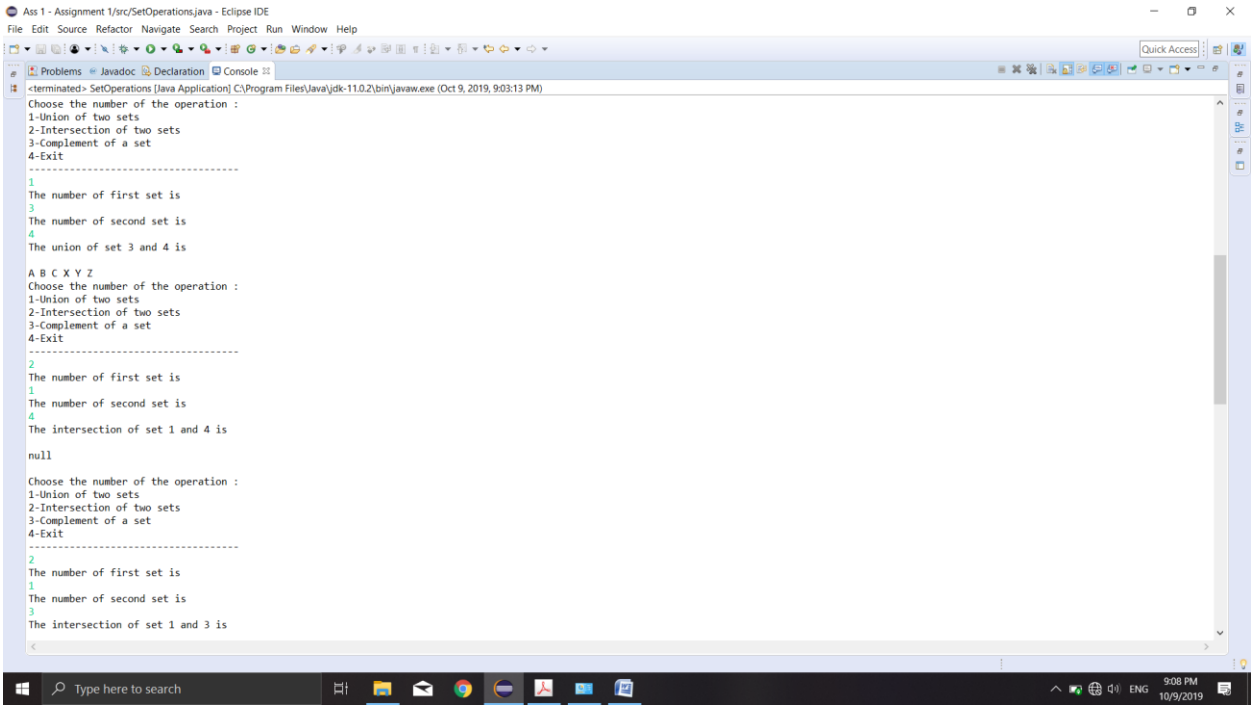
SetOperations.java
else if (choice == 3) {
String set;
boolean phi = true;
System.out.println("The number of the set is");
set = scan.next();
while (true) {
try {
while ((Integer.valueOf(set) > n) || (Integer.valueOf(set) <= 0)) {
System.out.println("Enter a valid number");
set = scan.next();
}
if ((Integer.valueOf(set) <= n) && (Integer.valueOf(set) > 0)) {
break;
}
}
catch (NumberFormatException | NullPointerException nfe){
System.out.println("Enter a valid number");
set = scan.next();
}
}
System.out.println("The complement of set " + set + " is");
System.out.println();
for (i = 0 ; i < numbers.length ; i++) {
if ((numbers[i] == null) || (!numbers[i].contains(set))) {
System.out.print(String.valueOf(universe[i]) + " ");
phi = false;
}
}
if (phi) {
System.out.println("null");
}
}
else if (choice == 4) {
System.out.println();
System.out.println("Thank you");
System.out.println("==========");
break;
}
}
scan.close();
}
}
Writable
Smart Insert
43 : 16
Type here to search
ENG
8:57 PM
10/9/2019

SAMPLE RUNS


Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Problems Javadoc Declaration Console
<terminated> SetOperations [Java Application] C:\Program Files\Java\jdk-11.0.2\bin\javaw.exe (Oct 9, 2019, 9:03:13 PM)
Enter the universe elements and hit Enter when you finish :
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Enter the number of subsets
4
Enter elements of the subset number 1 :
A E I O U
Enter elements of the subset number 2 :
S P I D E R
Enter elements of the subset number 3 :
A Z B Y C X
Enter elements of the subset number 4 :
X Y Z
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

1
The number of first set is
1
The number of second set is
4
The union of set 1 and 4 is
A E I O U X Y Z
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

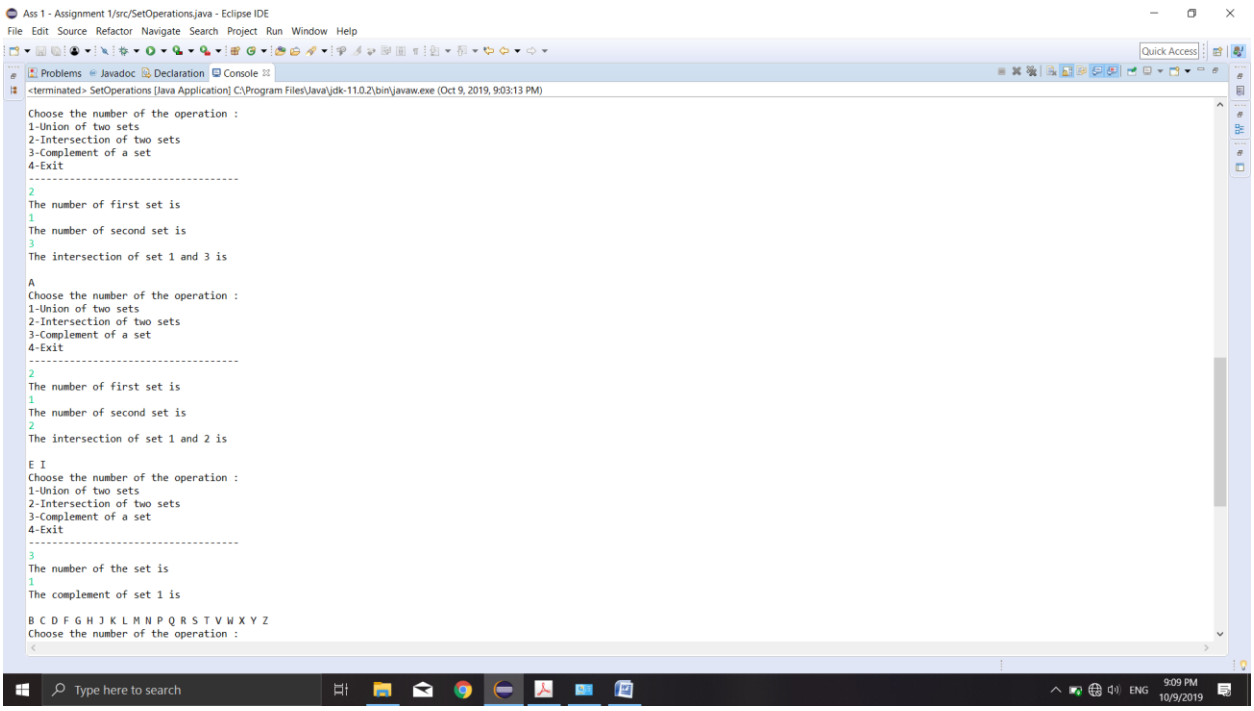
1
The number of first set is
1
The number of second set is
2
The union of set 1 and 2 is
A D E I O P R S U
Choose the number of the operation :
Type here to search
ENG
9:08 PM
10/9/2019


Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Problems Javadoc Declaration Console
<terminated> SetOperations [Java Application] C:\Program Files\Java\jdk-11.0.2\bin\javaw.exe (Oct 9, 2019, 9:03:13 PM)
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

1
The number of first set is
3
The number of second set is
4
The union of set 3 and 4 is
A B C X Y Z
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

2
The number of first set is
1
The number of second set is
4
The intersection of set 1 and 4 is
null
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

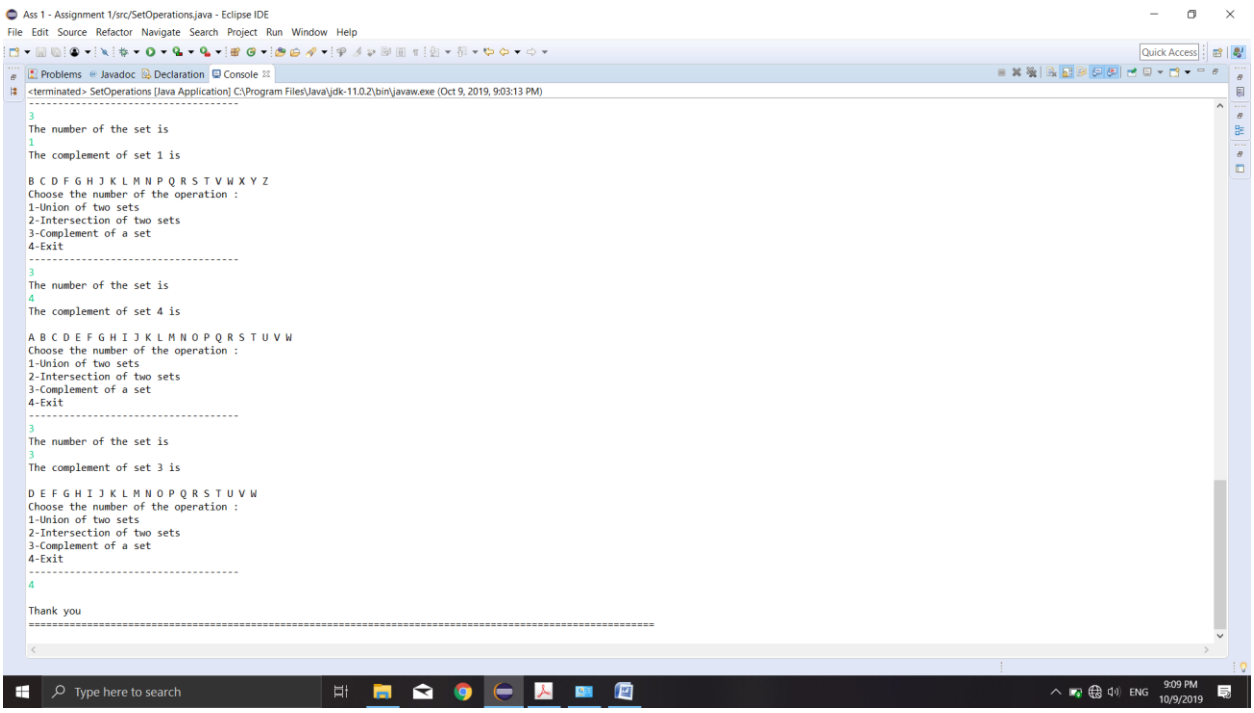
2
The number of first set is
1
The number of second set is
3
The intersection of set 1 and 3 is
Type here to search
ENG
9:08 PM
10/9/2019


Ass 1 - Assignment 1/src/SetOperations.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Problems Javadoc Declaration Console
<terminated> SetOperations [Java Application] C:\Program Files\Java\jdk-11.0.2\bin\javaw.exe (Oct 9, 2019, 9:03:13 PM)
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

2
The number of first set is
1
The number of second set is
3
The intersection of set 1 and 3 is
A
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

2
The number of first set is
1
The number of second set is
2
The intersection of set 1 and 2 is
E I
Choose the number of the operation :
1-Union of two sets
2-Intersection of two sets
3-Complement of a set
4-Exit

3
The number of the set is
1
The complement of set 1 is
B C D F G H J K L M N P Q R S T V W X Y Z
Choose the number of the operation :
Type here to search
ENG
9:09 PM
10/9/2019



TEAM

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