به نام او	**ساختمان‌های داده**	

دانشکده
مهندسی کامپیوتر

مدرس:
دکتر حسین رحمانی

نام و نام خانوادگی:

شماره دانشجویی:

توجه:

- **تاریخ تحویل:** 1400/09/02 23:59:59
- اگر برای جواب‌دادن به سوالی نیاز به پیش‌فرضی دارید، فرض خود را صریحا نوشته و با توجه به فرض خود به ارائه جواب بپردازید.
- به هیچ وجه تمرینی را از دیگران کپی نکنید. درصورت مشاهده تقلب و کپی در تمرینات، نمره هردو طرف **صفر** درنظر گرفته می‌شود.
- طراح: صادق جعفری

	تمرین عملی سری سوم (tree, binary search)	**نمره**
	Implement BST(binary search tree) with the following features : getmax(return number) insert(return number) getmin(return number) delete(return Boolean) search(return Boolean) inorder(return list of numbers) postorder(return list of numbers) preorder(return list of numbers) hint : in case of duplicate insertion , new value will be set on the right side of the old value.(specify left children as < and right children as =>.) Inputs : n number of values that exist in the BST a b c d . . . (number of values = n) m number of orders getmax getmin search value postorder insert value delete value inorder preorder outputs :	**15**

	max value min value Boolean List of values value Boolean List of values List of values Example : Inputs : 5 1 2 5 4 7 8 insert 1 search 9 getmax inorder delete 2 postorder preorder getmin outputs : 1 false 7 1 1 2 4 5 7 true 1 7 5 4 1 1 4 1 5 7 1	
35	Implement the search tree that has the following features : 1. We have some data with multi properties and we want to search on their properties. 2. We can search on multiple properties. 3. Middle nodes and root are conditions. 4. Leaves are data. 5. Each node only check one property. 6. You most find most effective property for each node.	**2**

7. Our objects in this question are persons(name, age, weight, gender).
8. Methods that you must implement them are :
    - Insert(name, age, weight, gender) return person
    - Delete(name, age, weight, gender) return Boolean(delete only one item)
    - Search(name, age, weight, gender) return list of persons

Points:

1- Implement this question.(15 score)
2- Write the report that explain your algorithm.(5 score)
3- Specify the test criteria that can show correctness and performance of your code and write code to measure your algorithm.(5 score)
4- Write the report that answer this question : “why you choose this criteria to test your algorithm?”.(5 score)
5- Record a voice(maximum 2 minutes) that answer this question: “why am I answering this question? explain prob and cons of this kind of question”.(5 score)

Input :

N: number of primitive persons
name(str) age(int) weight(float) gender(F,M)
.
.
.
M: number of orders
insert name age weight gender
delete name age weight gender
search name age weight gender

output :

person
true/false
(name1, age1, weight1, gender1), (name2, age2, weight2, gender2), . . .

hint : in delete and search each parameters can be null and we need at least one parameter.

Example :

	Input : 4 Ali 10 30 M Maryam 20 60 F Reza 40 100 M Zahra 15 50 F 4 insert Mehdi 20 80 M search null null null M delete Ali *10* null null search Ali *10* null M output : Mehdi 20 80 M (Ali, 10, 30, M), (Mehdi, 20, 80, M), (Reza, 40, 100, M) true null	

موفق باشید.