

No.	Package	Type	Name	Return Type				
1	main.java.writer	Class	DataWriter	BufferedWriter				
				Constructor				
				void				
				void				
				void				
2		Class	Permission	boolean				
				int				
				Constructor				
				void				
				boolean				
				int				
				void				
				void				
				void				
3		Class	User	int				
				Set<Integer>				
				Map<String, Permission>				
				Constructor				
				boolean				
				int				
				void				
				int				
				void				
				Map<String, Permission>				
				void				
				void				
				void				
				void				
				void				
				boolean				
				boolean				
								BufferedReader
								DataWriter
User[]								
void								



				void
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Variables/ Methods
writer
DataWriter(BufferedWriter writer)
write(User user)
write(String ln)
close
direct
count
Permission(boolean direct, int count)
setDirect(boolean direct)
isDirect()
getCount()
incCount()
incCount(int delta)
decCount()
manager
directStaffs
permissions
User(String[] data)
setManager(int manager)
getManager()
isManager()
Set<Integer> getDirectStaffs()
addDirectStaff(int staff)
getPermissions()
addDirectPermissions(Set<String> permissions)
addIndirectPermission(String permission, int numberOfAppearances)
addIndirectPermission(Map<String, Permission> permissions)
removeDirectPermissions(Set<String> permissions)
removeIndirectPermission(String permission)
removeIndirectPermission(Set<String> permissions)
reader
writer
users
setReader(BufferedReader reader)

setWriter(DataWriter writer)

setUsers(User[] users)

getUsers()

addIndirectPermissionsToManagers(int userId, Set<String> permissions)

removeIndirectPermissionFromManagers(int userId, Set<String> permissions)

addFullPermissionsForEachUserUsingDFS(int userId)

execute()

exportDebug(String string)

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exportDebug(int userId, String string)
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Description
Write data to output stream. Output stream can be terminal or file
Constructor for DataWriter class, assign BufferedWriter
Write data to output stream
Write data to output stream, using for NewLine case
Close output stream
true if this permission is a direct-permission. Otherwise false
Number of appearance of this permission that user manages. It Includes both direct-permissions and indirect-permissions
Set value for <b>direct</b> and <b>count</b> variables
Set value for the direct variable
Return value of direct variable
Return value of <b>count</b> variable
Increase <b>count</b> variable by 1
Increase <b>count</b> variable by <b>delta</b>
Decrease <b>count</b> variable by 1
Manager of this user, manager of CEO is -1
All of staffs that this user manages directly
Contains all permissions of user, including direct-permissions and indirect-permissions. Direct-permission is permission that user managed directly, indirect-permission is permission that user manages indirectly. The value corresponding to each key is Permission
Constructor for User class, assign permissions to user
Set manager for user
Get manager of user
This user is manager if having at least one staff that user manages directly
Get all staffs that user manages directly
Add a staff to user. After this operation, user will directly manage this staff
Get all permissions of user in Map format
Add a set of direct-permissions to user
Add an indirect-permission to user
Add indirect-permissions to user
Remove direct-permissions from user
Remove an indirect-permission from user
Remove indirect-permissions from user
Store buffer reader that using to read input data. Buffer reader may be terminal or file
Store buffer writer that using to write output data. Buffer writer may be terminal or file
Store all users of company
Set buffer reader that using to read input data. Buffer reader may be terminal or file

Set buffer writer that using to write output data. Buffer writer may be terminal or file
Set users for company
Get all of users of company
Add indirect-permissions to user and all user's managers
Remove indirect-permissions from user and all user's managers
Add all direct-permissions and all indirect permissions for all users using the Depth First Search algorithm (DFS). After operation, each user has all direct permissions of self user and all permissions of user that he manages. By using DFS, beginning from CEO (highest-level), each staff (from lowest-level to highest-level) will be added more indirect-permissions that he manages
<p><b>1. Step 1:</b> Read number of users, permissions from buffer and assign for each user</p> <ul style="list-style-type: none"> <li>- Read number of users: N</li> <li>- Read permissions for CEO from input buffer, add permissions to CEO. The permissions are direct-permissions of CEO</li> <li>- Read N lines from input buffer, for X-th line: <ul style="list-style-type: none"> <li>+ Add permissions to user X. The permissions are direct-permissions of user X</li> </ul> </li> </ul> <p><b>2. Step 2:</b> Read and assign manager, staffs for each user</p> <ul style="list-style-type: none"> <li>- Read N lines from input buffer, for X-th line: <ul style="list-style-type: none"> <li>+ If data is string <b>CEO</b>: CEO is manager of user X <ul style="list-style-type: none"> <li>o Set -1 for CEO's manager</li> <li>o Add user X to list direct-staffs of CEO</li> </ul> </li> <li>+ If data is number, assume Y, Y is manager of user X <ul style="list-style-type: none"> <li>o Set Y for user X's manager</li> <li>o Add user XX to list direct-staffs of user Y</li> </ul> </li> </ul> </li> </ul> <p><b>3. Step 3:</b> Add full permissions (direct-permissions and indirect-permissions) for each user, using Depth First Search (DFS) algorithm, beginning from CEO.</p> <ul style="list-style-type: none"> <li>- Add full-permissions (direct-permissions + indirect permissions) for all users using DFS.</li> </ul> <p><b>4. Step 4:</b> Write output result to writer buffer for Question 1</p> <ul style="list-style-type: none"> <li>- Get full-permissions from user to write</li> </ul> <p><b>5. Step 5:</b> Process command and update permissions for user.</p> <ul style="list-style-type: none"> <li>- Read remain lines from input buffer, for each line: <ul style="list-style-type: none"> <li>+ if data is string of format <b>ADD X Y</b> <ul style="list-style-type: none"> <li>o Add direct-permission Y to user X</li> <li>o Add indirect-permission Y to all user X's managers (using DFS)</li> </ul> </li> <li>+ if data is string of format <b>QUERY X</b></li> </ul> </li> </ul>
<p>Running in "PRODUCT" or "DEBUG" mode.</p> <ul style="list-style-type: none"> <li>- In "PRODUCT" mode: only export data follow requirements</li> <li>- In "DEBUG" mode: export more debug data to detect progress of algorithm operation</li> <li>- export debug data for all users</li> </ul>



Running in "PRODUCT" or "DEBUG" mode.

- In "PRODUCT" mode: only export data follow requirements
- In "DEBUG" mode: export more debug data to detect progress of algorithm operation
- export debug data for one specific user