REQUIREMENTS

You need to design a programming module PERMISSIONS that would allow Caller to
Grant a permission to a user
Check if a user has a particular permission

Caller is an external system that uses our module (particularly it calls our API).

Permission is a user right to take an action or access a resource. Permissions for resource access can be READ or WRITE. For example, Caller can grant a permission ”reboot the server” (an example of action) OR write to a file “C:/readme.txt” (an example of resource) to a user Andrew.

Caller can grant permissions directly to a user OR via roles. If Caller wants to grant permissions via roles then Caller needs to register a role, grant permissions to the role and then assign the role to a user.

Caller can assign many roles to a user.

As a note, our module (you are designing) doesn’t provide any dictionaries to Caller. All objects (including Users) are created / managed by Caller. Our module provides ONLY functionality.

OUTCOME

NOTE: You don’t have to strictly use a specific programming language for the exercise. You can use just a meta syntax that would give us an idea of your solution - we’re not going to compile it for sure :).

We would expect you to write module API (a list of functions with parameters) and design a database for the module. A list of functions can look like this (this is ONLY an example and companies and employees have nothing to do with this exercise):

```
function AddEmployee(company, first_name, last_name, age): boolean;
function AddJob(company, first_name, last_name, age): boolean;
function IsEmployeeFired(employeeId): boolean;
...
```

If you want to pass an object as a parameter you can describe an object separately:

```
Class Company {
      String name;
      String address;
      Integer taxId;
}
```

Database design can be presented as a list of tables with most important fields (no need to define indexes, etc). For example,

```
Table Companies {
      Id,
Name,
      Address,
      TaxId
}
```

```
Table Employees {
      Id,
      CompanyId, // this is a foreign key to Company
      FirstName,
      LastName,
      Job
}
```

```
##########################################################################################
```

```
module PERMISSION {

      function AddUser(FirstName, LastName, Email, PhoneNumber): boolean;

      fanction HasPermissionOf(UserId, PermissionId): boolean;

      function AddUserRole(userId, RoleId): boolean;

      function RemoveUserRole(UserId, RoleId);

      function AddPermission(): boolean; // useing our CallerId

      function RemovePermission(permissionId);

      function AddPermissionOfUser(UserId, PermissionId): boolean;

      function AddPermissionByRole(RoleId, PermissionId);

      function UserPermissionRevoke(UserId, PermissionId);

      function RevokePermissionByRole(RoleId, PermissionId);
}
```

```
Class Coller {
      String Name;
      .....
      .....
}

Class CollerUser {
      Integer UserId;
      Integer CollerId;
}

Class User {
      String FirstName;
      String LastName;
```

```
      String Email;
      String PhonNumber;
}

Class Role {
      String Name;
}

Class UserRole {
      Integer UserId;
      Integer RoleId;
}

Class Permission {
      String type;
      Integer CallerId;
}

Class UserPermission {
      Integer UserId;
      Integer PermissionId;
}




************** Database **************

Table Callers {
      Id,
      Name
      ....
      ....
}

Table Users {
      Id,
      firstName,
      lastName,
      email,
      phonNumber
}

Table Roles {
      Id,
      Name
}

Table UserRoles {
      Id,
      UserId, // this is a foreign key to User
      RoleId // this is a foreign key to Role
}



Table CallerUsers {
      Id,
      CallerId, // this is a foreign key to Caller
```

```
      UserId    // this is a foreign key to User
}



Table Permissions {
      Id,
      Type,
      CallerId    // this is a foreign key to Caller
}

Table UserPermissions {
      Id,
      PermissionId, // this is a foreign key to Permission
      UserId    // this is a foreign key to User
}
```