

E CERTIFICATE MANAGEMENT FOR UNIVERSITY

Relational Algebra

User

| User_id | First Name | Middle Name | Last Name | user_email         | user_address | H_login_id | H_Role_id |
|---------|------------|-------------|-----------|--------------------|--------------|------------|-----------|
| 101     | Deepanjana | NULL        | Das       | Deepdas@gmail.com  | Hyderabad    | 20221      | 1         |
| 102     | Doradla    | Indra       | Neela     | Neelu@gmail.com    | Bengaluru    | 20222      | 1         |
| 103     | Gadde      | Sai         | Santhosh  | Santhosh@gmail.com | Hyderabad    | 20223      | 3         |
| 104     | Gaurav     | NULL        | Verma     | Gaurav@gmail.com   | Jhansi       | 20224      | 2         |
| 105     | Yogesh     | Kumar       | Nayak     | Yogesh@gmail.com   | Rajasthan    | 20225      | 4         |

User M Login

| User_id | First Name | Middle Name | Last Name | user_email         | user_address | Login_id | Login_role_id | Login_username | Login_Passwrđ |
|---------|------------|-------------|-----------|--------------------|--------------|----------|---------------|----------------|---------------|
| 101     | Deepanjana | NULL        | Das       | Deepdas@gmail.com  | Hyderabad    | 20221    | 1             | Deep@21        | qwe1          |
| 102     | Doradla    | Indra       | Neela     | Neelu@gmail.com    | Bengaluru    | 20222    | 1             | Neelu@22       | rtYu2         |
| 103     | Gadde      | Sai         | Santhosh  | Santhosh@gmail.com | Hyderabad    | 20223    | 3             | Sai@23         | yuii3         |
| 104     | Gaurav     | NULL        | Verma     | Gaurav@gmail.com   | Jhansi       | 20224    | 2             | Gaurav@24      | iopa4         |
| 105     | Yogesh     | Kumar       | Nayak     | Yogesh@gmail.com   | Rajasthan    | 20225    | 4             | Yogesh@25      | dfgh5         |

$\pi(\text{User\_id, First Name, Middle Name, Last Name, login\_role\_id})(\text{User1})$

User1

| User_id | First Name | Middle Name | Last Name | Login_role_id |
|---------|------------|-------------|-----------|---------------|
| 101     | Deepanjana | NULL        | Das       | 1             |
| 102     | Doradla    | Indra       | Neela     | 1             |
| 103     | Gadde      | Sai         | Santhosh  | 3             |
| 104     | Gaurav     | NULL        | Verma     | 2             |
| 105     | Yogesh     | Kumar       | Nayak     | 4             |

User1 M Role

User2

| User_id | First Name | Middle Name | Last Name | role_id | role_name   | role_desc                                  |
|---------|------------|-------------|-----------|---------|-------------|--|
| 101     | Deepanjana | NULL        | Das       | 1       | Faculty     | Verifies the details in the certificate    |
| 102     | Doradla    | Indra       | Neela     | 1       | Faculty     | Verifies the details in the certificate    |
| 103     | Gadde      | Sai         | Santhosh  | 3       | Super_Admin | Grant Authority to manage Certifcates      |
| 104     | Gaurav     | NULL        | Verma     | 2       | System_User | Requests and Issues Certificates           |
| 105     | Yogesh     | Kumar       | Nayak     | 4       | Maintainor  | Can be a System Admin, System User or both |

$\sigma(\text{role\_id} = 1)\text{User3}$

| User_id | First Name | Middle Name | Last Name | role_id | role_name | role_desc                               |
|---------|------------|-------------|-----------|---------|-----------|---|
| 101     | Deepanjana | NULL        | Das       | 1       | Faculty   | Verifies the details in the certificate |
| 102     | Doradla    | Indra       | Neela     | 1       | Faculty   | Verifies the details in the certificate |

$\sigma(\text{role\_id} = 1)\text{User3}$

| User_id | First Name | Middle Name | Last Name | role_id | role_name   | role_desc                             |
|---------|------------|-------------|-----------|---------|-------------|---------------------------------------|
| 103     | Gadde      | Sai         | Santhosh  | 3       | Super_Admin | Grant Authority to manage Certifcates |

$\sigma(\text{role\_id} = 2)\text{User3}$

| User_id | First Name | Middle Name | Last Name | role_id | role_name   | role_desc                        |
|---------|------------|-------------|-----------|---------|-------------|----------------------------------|
| 104     | Gaurav     | NULL        | Verma     | 2       | System_User | Requests and Issues Certificates |

$\sigma(\text{role\_id} = 4)\text{User3}$

| User_id | First Name | Middle Name | Last Name | role_id | role_name  | role_desc                                  |
|---------|------------|-------------|-----------|---------|------------|--|
| 105     | Yogesh     | Kumar       | Nayak     | 4       | Maintainor | Can be a System Admin, System User or both |

Student

| stu_id   | First Name | Middle Name | Last Name | stu_add    | stu_email       |
|----------|------------|-------------|-----------|------------|-----------------|
| 20235001 | Mudavth    | NULL        | Rohit     | Hyderabad  | Rohit@gmail.com |
| 20235002 | Doradla    | Indra       | Neela     | Bengaluru  | Neelu@gmail.com |
| 20235003 | Jana       | NULL        | Roy       | Kolkata    | Jana@gamil.com  |
| 20235004 | Tara       | Nitesh      | Kumar     | Chandigarh | Tara@gmail.com  |
| 20235005 | Racharla   | Ravi        | Teja      | Hyderabad  | Ravi@gmail.com  |

$\sigma(\text{H\_Role\_id}=1)\text{User}$  →  $\pi(\sigma(\text{H\_Role\_id}=1)\text{User})$

Result1

| User_id | First Name | Middle Name | Last Name | user_email        | user_address | H_login_id | H_Role_id |
|---------|------------|-------------|-----------|-------------------|--------------|------------|-----------|
| 101     | Deepanjana | NULL        | Das       | Deepdas@gmail.com | Hyderabad    | 20221      | 1         |
| 102     | Doradla    | Indra       | Neela     | Neelu@gmail.com   | Bengaluru    | 20222      | 1         |

User M Login

Final Result

| User_id | stu_id   | First Name | Middle Name | Last Name | stu_add   | stu_email       | H_login_id | H_Role_id |
|---------|----------|------------|-------------|-----------|-----------|-----------------|------------|-----------|
| 102     | 20235002 | Doradla    | Indra       | Neela     | Bengaluru | Neelu@gmail.com | 20222      | 1         |

$\rho_{10}(\text{Final Result})$

TA

| User_id | stu_id   | First Name | Middle Name | Last Name | stu_add   | stu_email       | H_login_id | H_Role_id |
|---------|----------|------------|-------------|-----------|-----------|-----------------|------------|-----------|
| 102     | 20235002 | Doradla    | Indra       | Neela     | Bengaluru | Neelu@gmail.com | 20222      | 1         |

User

| User_id | First Name | Middle Name | Last Name | user_email         | user_address | H_login_id | H_Role_id |
|---------|------------|-------------|-----------|--------------------|--------------|------------|-----------|
| 101     | Deepanjana | NULL        | Das       | Deepdas@gmail.com  | Hyderabad    | 20221      | 1         |
| 102     | Doradla    | Indra       | Neela     | Neelu@gmail.com    | Bengaluru    | 20222      | 1         |
| 103     | Gadde      | Sai         | Santhosh  | Santhosh@gmail.com | Hyderabad    | 20223      | 3         |
| 104     | Gaurav     | NULL        | Verma     | Gaurav@gmail.com   | Jhansi       | 20224      | 2         |
| 105     | Yogesh     | Kumar       | Nayak     | Yogesh@gmail.com   | Rajasthan    | 20225      | 4         |

$\sigma(\text{H\_Role\_id} \geq 2)\text{User}$  →  $\pi(\text{User\_id, First Name, Middle Name, Last Name, user\_email})(\sigma(\text{H\_Role\_id} \geq 2)\text{User})$

System user

| User_id | First Name | Middle Name | Last Name | user_email       |
|---------|------------|-------------|-----------|------------------|
| 104     | Gaurav     | NULL        | Verma     | Gaurav@gmail.com |

$\sigma(\text{H\_Role\_id} \geq 3)\text{User}$  →  $\pi(\text{User\_id, First Name, Middle Name, Last Name, user\_email})(\sigma(\text{H\_Role\_id} \geq 3)\text{User})$

Super Admin

| User_id | First Name | Middle Name | Last Name | user_email         |
|---------|------------|-------------|-----------|--------------------|
| 103     | Gadde      | Sai         | Santhosh  | Santhosh@gmail.com |

table1 U table2

Maintainor

| User_id | First Name | Middle Name | Last Name | user_email         |
|---------|------------|-------------|-----------|--------------------|
| 103     | Gadde      | Sai         | Santhosh  | Santhosh@gmail.com |
| 104     | Gaurav     | NULL        | Verma     | Gaurav@gmail.com   |