Organ Donation & Transplant Matching System - Project Workflow

1. User Management (User Table)

Tasks Performed:

* Registration and authentication of donors, recipients, and hospital staff.
* Secure role-based access control.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Unique user ID | 1 |
| username | Varchar(100) | User's unique name | DonorJohn |
| email | Email | User’s email | [john@example.com](mailto:john@example.com) |
| password | Varchar(255) | Hashed password | hashed\_pw\_123 |
| role | Enum(admin, donor, recipient, hospital\_staff) | User role | donor |
| created\_at | DateTime | Timestamp of account creation | 2024-03-10 10:00:00 |

Output:

* Secure login system for all stakeholders.
* Different access levels for different user roles.

2. Donor Registration & Management (Donor Table)

Tasks Performed:

* Collects donor details and availability status.
* Links donors to compatible recipients.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Donor ID | 201 |
| user\_id | Foreign Key (User) | Donor reference | 1 (DonorJohn) |
| organ\_type | Varchar(255) | Organ available for donation | Kidney |
| blood\_type | Varchar(10) | Donor's blood group | O+ |
| availability\_status | Enum(available, unavailable) | Donor status | available |
| registered\_at | DateTime | Timestamp of donor registration | 2024-03-12 09:30:00 |

Output:

* Maintains up-to-date donor availability information.
* Allows donors to update their status as per medical evaluations.

3. Recipient Registration & Management (Recipient Table)

Tasks Performed:

* Stores recipient information and medical urgency.
* Links recipients to matching donors.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Recipient ID | 301 |
| user\_id | Foreign Key (User) | Recipient reference | 2 (RecipientJane) |
| required\_organ | Varchar(255) | Organ needed for transplant | Kidney |
| blood\_type | Varchar(10) | Recipient's blood group | O+ |
| urgency\_level | Enum(low, medium, high) | Urgency of transplant | high |
| added\_at | DateTime | Timestamp of recipient addition | 2024-03-14 11:00:00 |

Output:

* Keeps track of recipients awaiting transplants.
* Helps prioritize recipients based on medical urgency.

4. Organ Matching & Allocation (Matching Table)

Tasks Performed:

* Matches donors with recipients based on compatibility factors.
* Ensures optimal allocation to high-priority recipients.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Match ID | 401 |
| donor\_id | Foreign Key (Donor) | Matched donor | 201 |
| recipient\_id | Foreign Key (Recipient) | Matched recipient | 301 |
| match\_score | Decimal | AI-based compatibility score | 92.5 |
| status | Enum(pending, approved, completed) | Matching status | approved |
| matched\_at | DateTime | Timestamp of match creation | 2024-03-15 12:00:00 |

Output:

* Provides optimal donor-recipient matching based on medical compatibility.
* Keeps track of transplant status from matching to completion.

5. Hospital & Transplant Coordination (Hospital Table)

Tasks Performed:

* Manages hospitals responsible for transplant procedures.
* Tracks organ transport and medical operations.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Hospital ID | 501 |
| name | Varchar(255) | Hospital name | City General Hospital |
| location | Varchar(255) | Hospital address | 123 Main St, NY |
| contact\_info | Varchar(100) | Hospital contact | +1-555-1234 |
| status | Enum(active, inactive) | Hospital status | active |
| registered\_at | DateTime | Timestamp of hospital registration | 2024-03-18 12:00:00 |

Output:

* Provides hospital listings for transplant coordination.
* Allows hospitals to track ongoing transplant operations.

6. Legal Documentation & Consent Management (Legal Table)

Tasks Performed:

* Securely stores donor consent and hospital agreements.
* Ensures compliance with legal requirements.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Legal Document ID | 601 |
| donor\_id | Foreign Key (Donor) | Donor reference | 201 |
| document\_type | Varchar(255) | Type of legal document | "Consent Form" |
| file\_path | Varchar(255) | Document location | "documents/consent\_john.pdf" |
| uploaded\_at | DateTime | Timestamp of document upload | 2024-03-19 14:00:00 |

Output:

* Ensures secure storage of legal documents.
* Provides authorized hospital staff access to required documentation.

7. Notification System (Notification Table)

Tasks Performed:

* Sends updates on organ availability and transplant progress.
* Alerts hospitals and recipients in case of emergency transplants.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Notification ID | 701 |
| user\_id | Foreign Key (User) | Notification recipient | 2 (RecipientJane) |
| message | Text | Notification content | "A compatible kidney has been found for you." |
| status | Enum(unread, read) | Read status | unread |
| created\_at | DateTime | Timestamp of notification | 2024-03-20 10:00:00 |

Output:

* Notifies stakeholders about critical updates in real-time.
* Ensures seamless communication between donors, recipients, and hospitals.

8. Reporting & Analytics (Report Table)

Tasks Performed:

* Tracks trends in organ donation and transplant success rates.
* Provides data-driven insights for medical decision-making.

| Field Name | Data Type | Description | Example Data |
| --- | --- | --- | --- |
| id | Integer (Primary Key) | Report ID | 801 |
| report\_type | Varchar(255) | Type of report | "Transplant Success Rate" |
| generated\_by | Foreign Key (User) | Admin reference | 3 (AdminSmith) |
| file\_path | Varchar(255) | Report location | "reports/transplant\_success\_2024.pdf" |
| generated\_at | DateTime | Timestamp of report generation | 2024-03-21 08:00:00 |

Output:

* Helps healthcare institutions make data-driven decisions.
* Provides useful insights into donor trends and transplant effectiveness.

Conclusion

This workflow ensures an efficient Organ Donation & Transplant Matching System, allowing seamless donor-recipient matching, secure hospital coordination, and real-time updates. The system enhances transparency, security, and efficiency in organ transplant management.