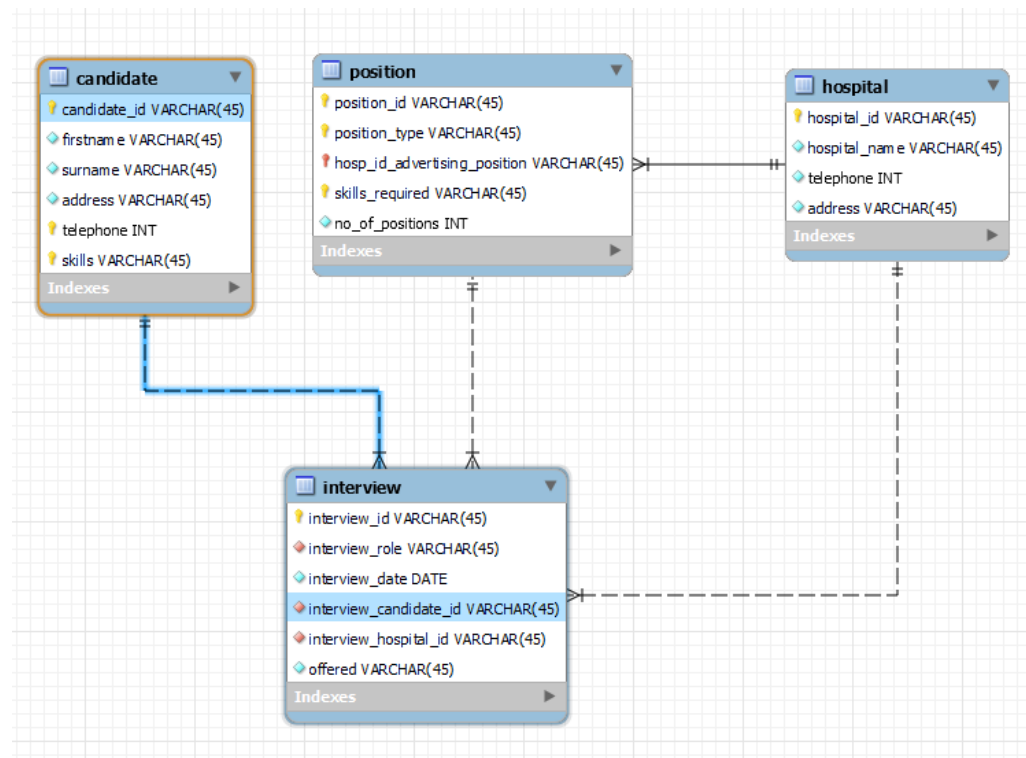


Data Model ERR diagram



Deliverables

- Description of my database**

I have used 4 tables to map all requirements to design.

My database is a relational database management system which contains candidate details applying for interview positions and receiving offers. The job positions are advertised by hospitals and interviews are scheduled for the candidates based on their skills and interview role required skillsets.

- Below are the details of each table and their assumptions**

hospital: contains details of all hospitals, address, phone number etc.

- 1) It is assumed that only 1 hospital of a particular brand is present in one location.
For example: Only 1 "Apollo" hospital is only present in Donegal. Another "Apollo" hospital may be present in Cork.
- 2) It is assumed all hospital names are different. And recognized by the Hospital_id attribute
If there are same hospital names, then we can identify them through hospital_id, telephone number and address

candidate: contains details of all candidates, first name, last name, address, phone number, skills etc.

- 1) It is assumed that - Two candidates may have same name and address. Hence, they can be distinguished by combination of candidate_id and telephone number
- 2) It is assumed ('candidate_id', 'skills', 'telephone') is used as candidate key since each candidate can have multiple skills
- 3) For a candidate_id, only 1 phone number can be tagged.
For example – Two candidates by same name "Nilesh Nayak" and address "Donegal" may have same skills "Python". However, They can be distinguished as 2 separate candidates because of candidate_id and telephone numbers being different.

interview: contains interview details such as interview id, hospital advertising the interview, candidate attending interview, interview date etc.

- 1) It is assumed that a candidate can attend
 - multiple interviews on the same day advertised by different hospitals
 - multiple interviews on the same day advertised by same hospital
 - multiple interviews on different days advertised by different hospitals
 - multiple interviews on different days advertised by same hospital

- 2) It is assumed that a candidate can require multiple skills to attend the interview based on job posting
- 3) Only those candidates registered in the "candidate" table can be called for interviews otherwise relationship will pop a foreign key constraint violation error.
- 4) It is assumed that a candidate can attend an interview despite him not having matching skills for the position as per requirement
- 5) Not all candidates having matching skills may be offered a position post attending the interview
- 6) Only those hospitals registered in the "hospital" table can conduct interviews in their hospitals otherwise relationship will pop a foreign key constraint violation error.
- 7) "interview_role" is a foreign key referencing "position_type" attribute in "position" table

position: contains details of all position/role offered, hospital advertising the position, skills required for the position and no. of positions which is up for grabs.

- 1) Only those hospitals registered in the "hospital" table can advertise open positions in the "position" table.
- 2) Since a position may have multiple skill requirement, "no_of_position" attribute in "position" table may need to be updated across all rows once a position is opened/closed or offer being rolled out.

- **Additions made**

-Initially I used a skill table to match a candidate to skill. However, it was scrapped later to avoid redundancy in data.
 -a combination of multiple attributes are chosen to identify candidate keys in "interview" and "position" table to avoid data duplication
 -added "offered" attribute in interview table based on requirement
 -added interview_date to capture interview dates based on requirement
 -rebuild the index after addition of foreign key constraints

- **Reaction policies used**

I added on update = "cascade" and on delete = "cascade" effect on foreign keys of "interview" and "position" table.
 Reason – to maintain data consistency and not violate foreign key constraints with "candidate" and "hospital" table

- **The Entity-Relationship (ER) diagram**

-shared above in page 1

- **Operating system**

windows

- **Constraints added including additional attributes necessary to link the tables**

Interview Table

Foreign Key Name	Referenced Table	Column	Referenced Column
interview_candidate	'nayak21200475'. 'candidate'	<input type="checkbox"/> interview_id	
interview_hospital	'nayak21200475'. 'hospital'	<input type="checkbox"/> interview_role	
interview_position	'nayak21200475'. 'position'	<input type="checkbox"/> interview_date	
		<input checked="" type="checkbox"/> interview_candid... candidate_id	
		<input type="checkbox"/> interview_hospit...	
		<input type="checkbox"/> offered	

Foreign Key Name	Referenced Table	Column	Referenced Column
interview_candidate	'nayak21200475'. 'candidate'	<input type="checkbox"/> interview_id	
interview_hospital	'nayak21200475'. 'hospital'	<input type="checkbox"/> interview_role	
interview_position	'nayak21200475'. 'position'	<input type="checkbox"/> interview_date	
		<input type="checkbox"/> interview_candid...	
		<input checked="" type="checkbox"/> interview_hospit... hospital_id	
		<input type="checkbox"/> offered	

Foreign Key Name	Referenced Table	Column	Referenced Column
interview_candidate	'nayak21200475'. 'candidate'	<input type="checkbox"/> interview_id	
interview_hospital	'nayak21200475'. 'hospital'	<input checked="" type="checkbox"/> interview_role	position_type
interview_position	'nayak21200475'. 'position'	<input type="checkbox"/> interview_date	
		<input type="checkbox"/> interview_candid...	
		<input type="checkbox"/> interview_hospit...	
		<input type="checkbox"/> offered	

Position Table

Foreign Key Name	Referenced Table	Column	Referenced Column
hosp_id	'nayak21200475'. 'hospital'	<input type="checkbox"/> position_id	
		<input type="checkbox"/> position_type	
		<input checked="" type="checkbox"/> hosp_id_advertis... hospital_id	
		<input type="checkbox"/> skills_required	
		<input type="checkbox"/> no_of_positions	

Codes for adding above constraints

```
ALTER TABLE `nayak21200475`.`position`  
ADD CONSTRAINT `hosp_id`  
FOREIGN KEY (`hosp_id_advertising_position`)  
REFERENCES `nayak21200475`.`hospital` (`hospital_id`)  
ON DELETE NO ACTION  
ON UPDATE NO ACTION;
```

```
ALTER TABLE `nayak21200475`.`interview`  
ADD CONSTRAINT `interview_candidate`  
FOREIGN KEY (`interview_candidate_id`)  
REFERENCES `nayak21200475`.`candidate` (`candidate_id`)  
ON DELETE NO ACTION  
ON UPDATE NO ACTION;
```

```
ALTER TABLE `nayak21200475`.`interview`  
ADD CONSTRAINT `interview_hospital`  
FOREIGN KEY (`interview_hospital_id`)  
REFERENCES `nayak21200475`.`hospital` (`hospital_id`)  
ON DELETE NO ACTION  
ON UPDATE NO ACTION;
```

```
ALTER TABLE `nayak21200475`.`interview`  
ADD CONSTRAINT `interview_position`  
FOREIGN KEY (`interview_role`)  
REFERENCES `nayak21200475`.`position` (`position_type`)  
ON DELETE NO ACTION  
ON UPDATE NO ACTION;
```

- **Appropriate data types for all attributes and primary key(s).**

Highlighted in yellow are primary & candidate keys applied to each of the table

```
CREATE TABLE `nayak21200475`.`hospital` (  
  `hospital_id` VARCHAR(45) NOT NULL,  
  `hospital_name` VARCHAR(45) NOT NULL,  
  `telephone` INT NOT NULL,  
  `address` VARCHAR(45) NOT NULL,  
  PRIMARY KEY (`hospital_id`));
```

```
CREATE TABLE `nayak21200475`.`candidate` (  
  `candidate_id` VARCHAR(45) NOT NULL,  
  `firstname` VARCHAR(45) NOT NULL,  
  `surname` VARCHAR(45) NOT NULL,  
  `address` VARCHAR(45) NOT NULL,  
  `telephone` INT NOT NULL,  
  `skills` VARCHAR(45) NOT NULL,  
  PRIMARY KEY (`candidate_id`, `skills`, `telephone`));
```

```
CREATE TABLE `nayak21200475`.`position` (  
  `position_id` VARCHAR(45) NOT NULL,  
  `position_type` VARCHAR(45) NOT NULL,  
  `hosp_id_advertising_position` VARCHAR(45) NOT NULL,  
  `skills_required` VARCHAR(45) NOT NULL,  
  `no_of_positions` INT NOT NULL,  
  PRIMARY KEY (`position_id`, `skills_required`, `position_type`, `hosp_id_advertising_position`));
```

```
CREATE TABLE `nayak21200475`.`interview` (  
  `interview_id` VARCHAR(45) NOT NULL,  
  `interview_role` VARCHAR(45) NOT NULL,  
  `interview_date` DATE NOT NULL,  
  `interview_candidate_id` VARCHAR(45) NOT NULL,  
  `interview_hospital_id` VARCHAR(45) NOT NULL,  
  `offered` VARCHAR(45) NOT NULL,  
  PRIMARY KEY (`interview_id`));
```

- **Stored proc for populating tables**



Codes below

```
CREATE PROCEDURE `enter_position_table_details` (IN position_id VARCHAR(45), IN position_type VARCHAR(45), IN
hosp_id_advertising_position VARCHAR(45), IN skills_required VARCHAR(45), IN no_of_positions INT)
BEGIN
INSERT INTO `nayak21200475`.`position` (`position_id`, `position_type`, `hosp_id_advertising_position`, `skills_required`,
`no_of_positions`)
VALUES ( position_id, position_type, hosp_id_advertising_position, skills_required, no_of_positions);
END
```

```
CREATE PROCEDURE `enter_interview_table_details` (IN interview_id VARCHAR(45), IN interview_role VARCHAR(45), IN
interview_date DATE, IN interview_candidate_id VARCHAR(45),
IN interview_hospital_id VARCHAR(45), IN offered VARCHAR(45))
BEGIN
INSERT INTO `nayak21200475`.`interview`
(`interview_id`, `interview_role`, `interview_date`, `interview_candidate_id`, `interview_hospital_id`, `offered`)
VALUES (interview_id, interview_role, interview_date, interview_candidate_id, interview_hospital_id, offered);
END
```

```
CREATE PROCEDURE `enter_candidate_table_details` (IN candidate_id VARCHAR(45), IN firstname VARCHAR(45), IN surname DATE,
IN address VARCHAR(45), IN telephone INT, IN skills VARCHAR(45))
BEGIN
INSERT INTO `nayak21200475`.`candidate` (`candidate_id`, `firstname`, `surname`, `address`, `telephone`, `skills`)
VALUES (candidate_id , firstname , surname, address, telephone, skills);
END
```

```
CREATE PROCEDURE `enter_hospital_table_details` (IN hospital_id VARCHAR(45), IN hospital_name VARCHAR(45), IN address
VARCHAR(45), IN telephone INT)
BEGIN
INSERT INTO `nayak21200475`.`hospital` (`hospital_id`, `hospital_name`, `address`, `telephone`)
VALUES (hospital_id, hospital_name, address, telephone);
END
```

- **Stored proc without parameterized queries (5,7,8,11)**

```
call nayak21200475.query5();
call nayak21200475.query7();
call nayak21200475.query8();
call nayak21200475.query11();
```

Note: query<number> relates to questions asked in Step 4

- **Stored proc with parameterized queries (1,2,3,4,6,9,10)**

```
call nayak21200475.query1('H001');
call nayak21200475.query2('Apollo');
call nayak21200475.query3('Nayak');
call nayak21200475.query4('10004');
call nayak21200475.query6('communication');
call nayak21200475.query9('2021-01-01');
call nayak21200475.query10('2021-01-01');
```

Note: query<number> relates to questions asked in Step 4

Insight: In parameterized stored procedure, input parameter name should not be same as column name in the database.
It will pop out all rows in underlying table.

Codes for each of the 11 stored procedure (some having parametric queries) in Step 4

```
CREATE PROCEDURE `query1` (IN hosp_id varchar(45))
BEGIN
select hospital_name from `nayak21200475`.`hospital` where hospital_id = hosp_id;
END
```

```
CREATE PROCEDURE `query2` (IN hosp_name varchar(45))
BEGIN
select * from `nayak21200475`.`hospital` where hospital_name = hosp_name;
END
```

```
CREATE PROCEDURE `query3` (in sur_name varchar(45))
BEGIN
select * from `nayak21200475`.`candidate` where surname = sur_name;
END
```

```
CREATE PROCEDURE `query4` (in pos_id varchar(45))
BEGIN
select distinct candidate_id, firstname, surname from candidate where skills in (select skills_required from `nayak21200475`.`position`
where position_id = pos_id);
END
```

```
CREATE PROCEDURE `query5`()
BEGIN
select count(distinct interview_candidate_id) from interview where offered = 'yes';
END
```

```
CREATE PROCEDURE `query6` (in skills_reqd varchar(45))
BEGIN
select position_type from position where skills_required = skills_reqd;
END
```

```
CREATE PROCEDURE `query7`()
BEGIN
select sum(b.no_of_positions) as no_of_positions from (select distinct position_id, no_of_positions from position where position_type =
"nurse") b;
END
```

```
CREATE PROCEDURE `query8`()
BEGIN
select h.hospital_name, p.position_type from position p , hospital h where p.hosp_id_advertising_position = h.hospital_id group by 1
order by 1 asc, 2 asc;
END
```

```
CREATE PROCEDURE `query9` (in intview_dt date)
BEGIN
select * from interview where `nayak21200475`.interview_date = intview_dt;
END
```

```
CREATE PROCEDURE `query10` (in intview_dt date)
BEGIN
select distinct interview_candidate_id from interview where `nayak21200475`.interview_date = intview_dt;
END
```

```
CREATE PROCEDURE `query11`()
BEGIN
select distinct b.interview_candidate_id , c.firstname, c.surname
from candidate c join
(select interview_candidate_id, count(*) from interview
group by interview_candidate_id
having count(*) >= 2) b
on b.interview_candidate_id = c.candidate_id;
END
```

Few additional tests checked after creating databases and adding constraints

Test 1

To test primary key and foreign key constraints, I add new entries in my base tables using stored procedure
It successfully added the new rows.

```
call nayak21200475.enter_candidate_table_details ('C0012','Miley', 'Jones', 'Wicklow', '9999916', 'active listening');  
call nayak21200475.enter_hospital_table_details ('H025','Kidneycare', 'Donegal', '888825');  
call nayak21200475.enter_interview_table_details ('I113','Virologist', '2021-01-01', 'C1010', 'H007', 'no');  
call nayak21200475.enter_position_table_details ('10011','Virologist', 'H001', 'investigation', '1');  
call nayak21200475.enter_position_table_details ('10011','Virologist', 'H001', 'critical thinking', '1');
```

Test 2

To check duplicate entries being added in my base tables using stored procedure, I used below queries and tried to see if my primary/candidate keys and table constraints are working as expected.

```
call nayak21200475.enter_candidate_table_details ('C005','Mikael', 'Souza', 'Dublin', '9999905', 'active listening');  
call nayak21200475.enter_hospital_table_details ('H001','Apollo', 'Donegal', '888801');  
call nayak21200475.enter_interview_table_details ('I113','Virologist', '2021-01-01', 'C1010', 'H007', 'yes');  
call nayak21200475.enter_position_table_details ('10001','Virologist', 'H001', 'investigation', '1');
```

It successfully popped – “Duplicate entry” error as shown below.

#	Time	Action	Message	Duration / Fetch
190	13:06:46	call nayak21200475.enter_candidate_table_details('C005','Mikael', 'Souza', 'Dubl...	Error Code: 1062. Duplicate entry 'C005-active listening-9999905' for key 'candid...	0.391 sec
191	13:07:42	call nayak21200475.enter_hospital_table_details('H001','Apollo', 'Donegal', '8888...	Error Code: 1062. Duplicate entry 'H001' for key 'hospital.PRIMARY'	0.157 sec
192	13:10:21	call nayak21200475.enter_interview_table_details('I101','Virologist', '2021-01-01', 'C...	Error Code: 1062. Duplicate entry 'I101' for key 'interview.PRIMARY'	0.079 sec
193	13:13:03	call nayak21200475.enter_position_table_details('10001','Virologist', 'H001', 'inve...	Error Code: 1062. Duplicate entry '10001-investigation-Virologist-H001' for key 'po...	0.156 sec