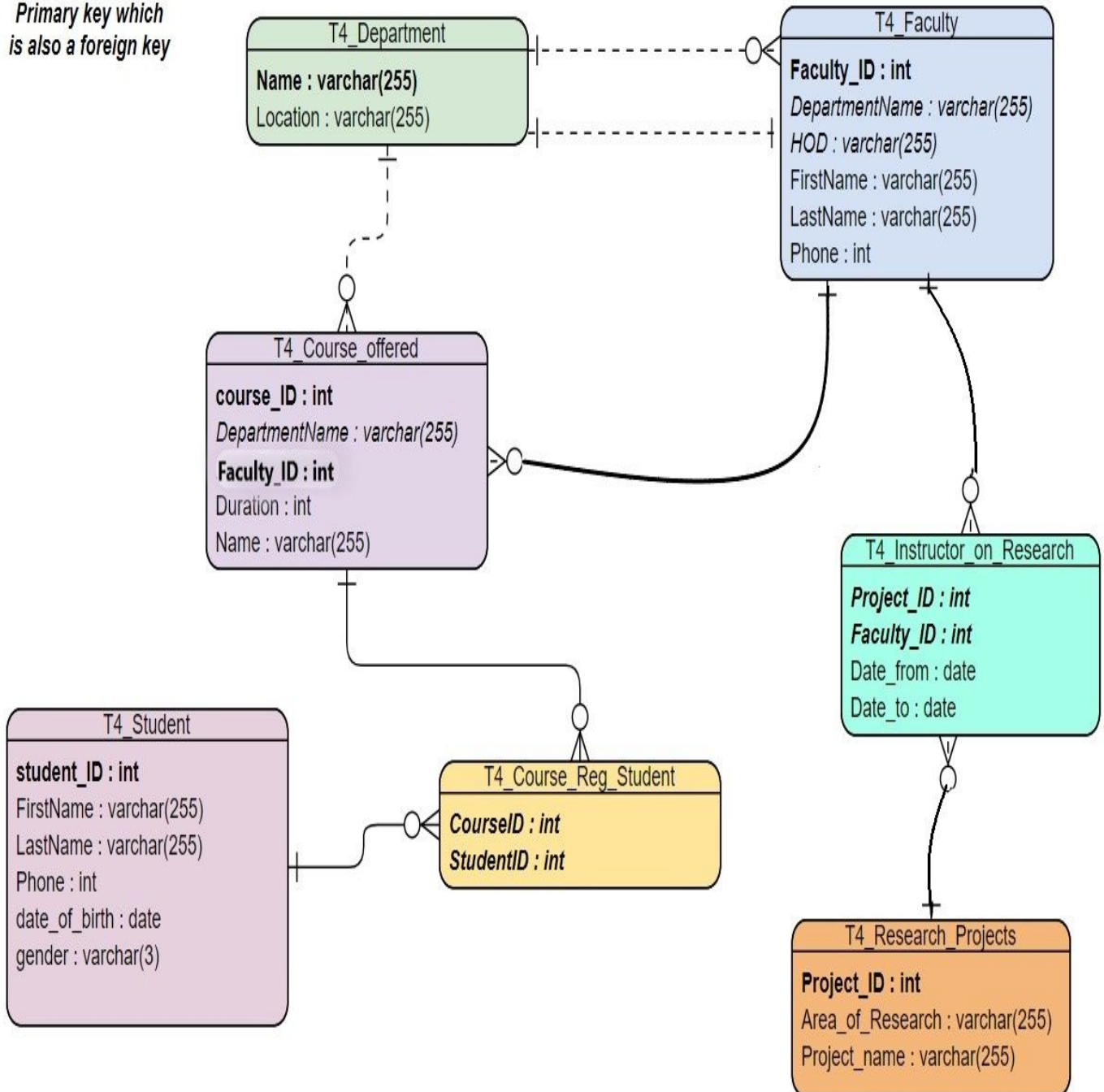


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**Bold:** Primary key  
*Italics:* Foreign Key  
***Bold+Italics:***  
Primary key which  
is also a foreign key



## EXPLANATION OF ER DIAGRAM:

Entity Name	Attributes	Primary Key	Foreign Key	Relationship	Entity Type
<b>T4_Department</b>	>Name  >Location	Name	-----	<div>T4_Faculty (One to many)</div> <div>T4_Faculty (One to one)</div> <div>T4_Course_offered (One to many)</div>	<u>Strong entity</u> because each department name is unique, has a primary key. Also it is not dependent on any other attribute.
<b>T4_Faculty</b>	>Faculty_ID >DepartmentName >HOD >FirstName >LastName >Phone	Faculty_ID	>DepartmentName  >HOD	<div>T4_Department (Many to one)</div> <div>T4_Department (One to one)</div> <div>T4_Course_offered (One to many)</div> <div>T4_Instructor_on_Research (one to many)</div>	<u>Strong entity</u> because each instructor id is unique, has a primary key.
<b>T4_Course_offered</b>	>Course_ID >DepartmentName >InstructorID >Duration >Name	Course_ID	>DepartmentName  >InstructorID	<div>T4_Department (Many to one)</div> <div>T4_Faculty (Many to one)</div> <div>T4_Course_Reg_Student (one to many)</div>	<u>Strong entity</u> because each course id is unique.
<b>T4_Student</b>	>ID >FirstName >LastName >Phone >date_of_birth >gender	ID	-----	T4_Course_Reg_Student (One to many)	<u>Strong entity</u> because each student id is unique.

<b>T4_Course_Reg_Student</b>	>CourseID  >StudentID	>CourseID  >StudentID	>CourseID  >StudentID	<u>T4_Course_offered (Many to one)</u>  T4_Student (Many to one)	<u>Weak entity</u> because it isn't unique (each student can have multiple courses and vice versa) and is dependent on T4_Student
<b>T4_Instructor_on_Research</b>	>ProjectID  >Faculty_ID  >Date_from  >Date_to	>ProjectID  >Faculty_ID	>ProjectID  >Faculty_ID	<u>T4_Faculty (Many to one)</u>  T4_Research_Projects (Many to one)	<u>Weak entity</u> because it isn't unique (each faculty can have multiple projects and vice versa). Also doesn't have a primary key.
<b>T4_Research_Projects</b>	>Project_ID  >Area_of_Research  >Project_name	Project_ID	-----	T4_Instructor_on_Research (One to many)	<u>Strong entity</u> because each project id is unique, and has a primary key..

### Discussion on relationships

- A **weak or non-identifying relationship** exists between two entities when the primary key of one of the related entities does not contain a primary key component of the other related entities. (Denoted using dotted lines.)
- A **strong or identifying relationship** is when the primary key of the related entity contains the primary key of the "parent"/shared entity. (Denoted using solid lines.)

Entity	Relationship	Reason
T4_Department	with T4_Faculty: <b>Weak</b>	No primary keys shared
	with T4_Course: <b>Weak</b>	No primary keys shared
T4_Faculty	with T4_Department: <b>Weak</b>	No primary keys shared
	with T4_course_offered: <b>Strong</b>	Common primary key: Faculty_ID
	with T4_Instructor_on_Research: <b>Strong</b>	Common primary key: Faculty_ID
T4_course_offered	with T4_Department: <b>Weak</b>	No primary keys shared
	with T4_Faculty: <b>Strong</b>	Common primary key: Faculty_ID
	with T4_Course_Reg_Student: <b>Strong</b>	Common primary key: CourseID
T4_Student	with T4_Course_Reg_Student: <b>Strong</b>	Common primary key: StudentID
T4_Course_Reg_Student	with T4_course_offered: <b>Strong</b>	Common primary key: CourseID
	with T4_Student: <b>Strong</b>	Common primary key: StudentID
T4_Instructor_on_Research	with T4_Faculty: <b>Strong</b>	Common primary key: Faculty_ID
	with T4_Research_Projects: <b>Strong</b>	Common primary key: Project_ID
T4_Research_Projects	with T4_Instructor_on_Research: <b>Strong</b>	Common primary key: Project_ID