

```
CREATE TABLE course (  
    code      text  not null,  
    title     text  not null  
);
```

```
CREATE TABLE offering (  
    offer_id   int   not null,  
    course_code text not null,  
    year       int   not null  
);
```

```
CREATE TABLE offering_mode (  
    offer_id   int   not null,  
    mode       text  not null  
);
```

```
CREATE TABLE student (  
    student_id int   not null,  
    name       text  not null  
);
```

```
CREATE TABLE prereq (  
    offer_id   int   not null,  
    prereq_code text  not null  
);
```

```
CREATE TABLE enrolled (  
    student_id int   not null,  
    offer_id   int   not null,  
    code       text  not null  
);
```

```
ALTER TABLE course  
ADD CONSTRAINT code_pk PRIMARY KEY (code),  
ADD UNIQUE (title);
```

```
ALTER TABLE offering
ADD CONSTRAINT offering_offer_id_pk PRIMARY KEY (offer_id),
ADD FOREIGN KEY (course_code) REFERENCES course(code);
```

```
ALTER TABLE offering_mode
ADD FOREIGN KEY (offer_id) REFERENCES offering(offer_id),
ADD CHECK (mode IN ('INT','DIS'));
```

```
ALTER TABLE student
ADD CONSTRAINT student_id_pk PRIMARY KEY (student_id);
```

```
ALTER TABLE prereq
ADD FOREIGN KEY (offer_id) REFERENCES offering(offer_id),
ADD FOREIGN KEY (prereq_code) REFERENCES course(code);
```

```
ALTER TABLE enrolled
ADD FOREIGN KEY (student_id) REFERENCES student(student_id),
ADD FOREIGN KEY (offer_id) REFERENCES offering(offer_id),
ADD FOREIGN KEY (code) REFERENCES course(code);
```

```
INSERT INTO course(code, title) VALUES
('159.171', 'Computational Thinking and Programming'),
('159.271', 'Computational Thinking for Problem Solving'),
('158.147', 'Database Design 1'),
('158.247', 'Database Design 2');
```

```
INSERT INTO offering(offer_id, course_code, year) VALUES
(0, '159.171', '2020'),
(1, '158.147', '2020'),
(2, '159.271', '2021'),
(3, '158.247', '2021');
```

```
INSERT INTO offering_mode(offer_id, mode) VALUES
```

```
(0, 'DIS'),
```

```
(1, 'INT'),
```

```
(1, 'DIS'),
```

```
(2, 'INT'),
```

```
(2, 'DIS');
```

```
INSERT INTO student (student_id, name) VALUES
```

```
(123456, 'John Doe'),
```

```
(654321, 'Joel Smith');
```

```
INSERT INTO prereq (offer_id, prereq_code) VALUES
```

```
(2, '159.171'),
```

```
(3, '158.147');
```

```
INSERT INTO enrolled (student_id, offer_id, code) VALUES
```

```
(123456, 0, '159.171'),
```

```
(123456, 2, '159.271'),
```

```
(654321, 2, '159.271');
```

```
SELECT DISTINCT
```

```
    e1.student_id,
```

```
    e1.code
```

```
FROM enrolled e1
```

```
JOIN prereq pr1 ON e1.offer_id = pr1.offer_id
```

```
JOIN offering o1 on e1.offer_id = o1.offer_id
```

```
WHERE o1.year = 2021 AND NOT EXISTS(
```

```
    SELECT 1
```

```
    FROM enrolled e2
```

```
    JOIN offering o2 ON e2.code = o2.course_code
```

```
    WHERE e1.student_id = e2.student_id
```

```
AND pr1.prereq_code = o2.course_code  
);
```

```
SELECT
```

```
SUM(CASE WHEN mode = 'INT' THEN 1 ELSE 0 END) AS internal,  
SUM(CASE WHEN mode = 'DIS' THEN 1 ELSE 0 END) AS distance,  
offering.year,  
offering.course_code
```

```
FROM offering_mode
```

```
JOIN offering ON offering_mode.offer_id=offering.offer_id
```

```
GROUP BY offering.year, offering.course_code;
```