DESIGN, ANALYSIS AND MANAGEMENT OF DATABASE FOR NORTHEASTERN UNIVERSITY'S FACILITIES

GROUP 15

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MISSION

1) Generate a database that would maintain data pertaining to the on-campus facilities available at Northeastern University and the magnitude of their utilization by students.

2) The database would enable administrative staff to propose ideal methods for efficient use of available resources and contribute to the enrichment of students' campus life.

FACILITIES

1. Study Space
2. Library
3. Campus Recreation
4. Food Court
5. University Health and Counseling Services (UHCS)
6. Career Design Center
7. Educational Services
8. Software Services
9. Housing
10. Transportation
11. Student Organization

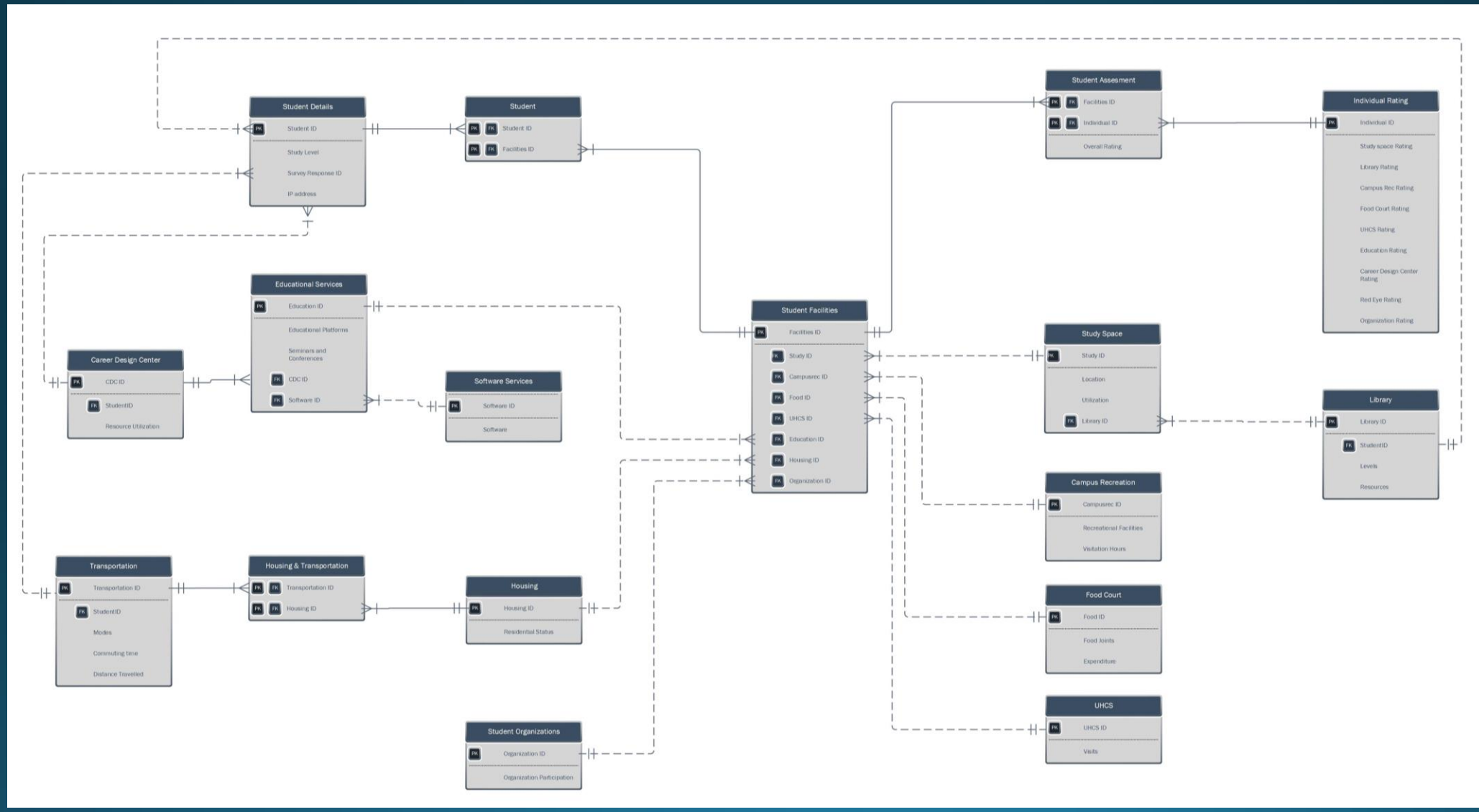
OBJECTIVES

- To create, maintain data and conduct searches on the facilities available across campus

- To create, maintain data and conduct searches on the utilization of these facilities

- To report on students' evaluation of facilities and determine if there is a need for improvement

ENTITY RELATIONSHIP DIAGRAM



DATA COLLECTION

SURVEY

- Designed a Survey on the Qualtrics platform
- 20 Questions
- Questions focused on the following :
    - Study Level
    - Most Visited Study Space and how often the location is visited
    - Most utilized library resources and levels
    - Most commonly visited recreational facility and time frame of visit
    - Most visited food joint and average expenditure per visit
    - Utilization of educational/software services and CDC
    - Distance travelled to University, transit time, modes of transportation used
    - Student Ratings

SURVEY RESPONSE

PRESENT STATUS

- Survey distributed to Undergraduate, Graduate, PhD
- Representation from **Graduate** and **PhD** students

FUTURE VISION

- Distribute survey through the University to all students for increased representation
- Provide the collected data to student organizations who would use the data to ensure students' needs are being advocated for

DATA IMPORT

- Data was exported from Qualtrics in the .csv format
- Data was then imported into SQL Server Management Studio using the Data import Wizard.

CREATING TABLES IN SQL SERVER

```
CREATE TABLE INDIVIDUALRATING
(
IndividualID INT IDENTITY NOT NULL PRIMARY KEY,
Studyspacerating INT NOT NULL,
Libraryrating INT NOT NULL,
Campusrecrating INT NOT NULL,
Foodcourtrating INT NOT NULL,
UHCSrating INT NOT NULL,
Educationrating INT NOT NULL,
CDCrating INT NOT NULL,
redeyerating INT NOT NULL,
Organizationrating INT NOT NULL
);
```

FUNCTIONS

- To create a computed column to determine if Red eye can be accessed

- Creating computed columns for individual ratings of all student facilities to determine the scope of improvement. **Condition:** If the rating is below 7, the facility can be improved. If the rating is above 7, the facility does not require immediate improvements.

```sql
/* 1) CREATING A COMPUTED COLUMN IN TRANSPORTATION
TABLE TO DETERMINE IF RED EYE CAN BE ACCESSED*/

CREATE FUNCTION ShuttleServices
(@distancetravelled VARCHAR(250))
Returns varchar(250)
AS

BEGIN
DECLARE @access VARCHAR(250)
SELECT @access = @DistanceTravelled


RETURN
(CASE
 WHEN @access = 'greater than 2 miles'
 THEN 'Red Eye/Shuttle Services cannot be accessed'
 WHEN  @access = 'less than 2 miles'
 THEN'Red Eye/Shuttle Services can be accessed'
 END);

END;


ALTER TABLE TRANSPORTATION
ADD ShuttleServicesAccess AS (dbo.ShuttleServices(DistanceTravelled));
```

```sql
/* 2) CREATING COMPUTED COLUMNS IN INDIVIDUAL RATING
TO DETERMINE SCOPE OF IMPROVEMENT - Shuttle Services */

Create function RedeyeServices
(@redeyerating INT)
RETURNS varchar(250)
AS

BEGIN
DECLARE @improvement INT
SELECT @Improvement = @redeyerating
FROM INDIVIDUALRATING

RETURN
(CASE
 WHEN @redeyerating < 7
 THEN 'Red Eye/Shuttle services needs improvement'
 ELSE 'Red Eye/Shuttle service does not need improvement'

 END);

END;

Alter Table INDIVIDUALRATING
Add ShuttleServiceImprovement as (dbo.RedeyeServices(redeyerating));
```

VIEWS

- To display all the students that are satisfied with all the facilities using Overall Rating (Satisfied, if overall rating > average rating)

- To display information on Study Level, Recreational Facilities, food joints, residential status and study space in one report

- To determine the rating per level in the library and to decide on the need for more effective distribution of study space.

```sql
/* 1) Creating a view to determine the students that are
satisfied with the Facilties (overall rating > Average Rating) */

Create view [Students rated above Average] as
Select FacilitiesID AS 'AboveAverageStudentID', OverallRating
from StudentAssesment
where OverallRating > (Select avg(OverallRating) from StudentAssesment);
```

```sql
/* 2) Creating a view to report StudentID, Study level, Recreational facilities
they prefer most, food joints, Residential status and Study Space*/

Create view [Students]
AS
Select s.StudentID, s.StudyLevel, c.RecreationalFacilities, f.FoodJoints,
h.ResidentialStatus, st.Location AS 'Most preferred Study Space'
FROM STUDENTDETAILS s
INNER JOIN CAMPUSRECREATION c
ON s.StudentID = c.CampusrecID
INNER JOIN FOODCOURT f
ON s.StudentID = f.FoodID
INNER JOIN HOUSING h
ON s.StudentID = H.HousingID
INNER JOIN  STUDYSPACE st
ON s.StudentID = ST.StudyID
```

```sql
-- 3) Creating a view to report the average rating per level in the library

CREATE VIEW [level_avg_rating]
AS
SELECT l.Levels, AVG(i.Libraryrating) 'Average Rating',
(CASE
WHEN AVG(i.Libraryrating) < 7
THEN 'Needs improvement'
ELSE 'Does not need improvement'
END) AS NeedforImprovement
FROM LIBRARY l
INNER JOIN INDIVIDUALRATING i
ON l.StudentID=i.IndividualID
GROUP BY  l.Levels;
```

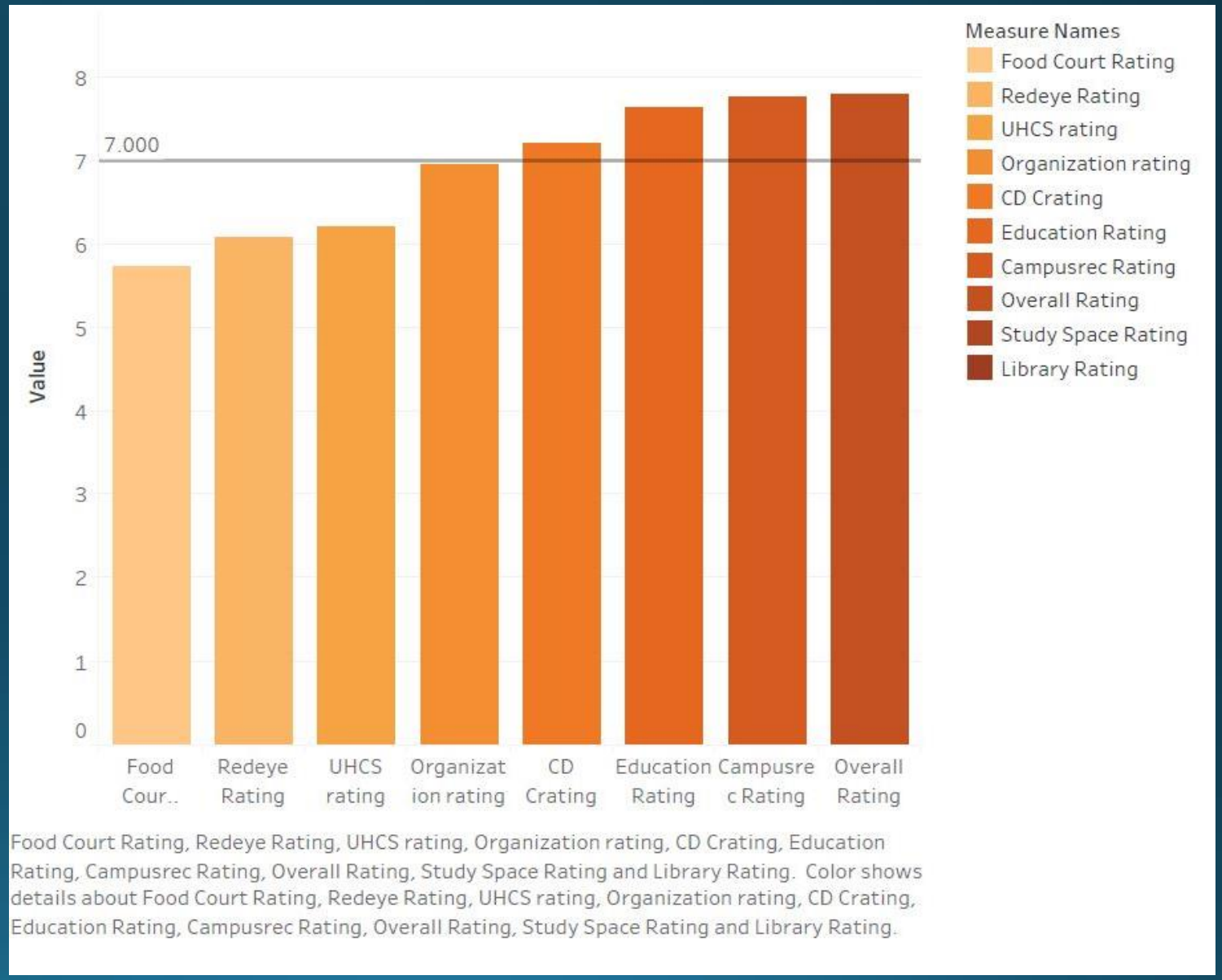
DATA ENCRYPTION

To maintain confidentiality of the respondents on our survey, we have encrypted the IP address.

```
-- CREATE DB master key
CREATE MASTER KEY
ENCRYPTION BY PASSWORD = 'Teamhusky_15' ;

-- certificate to protect symmetry key
CREATE CERTIFICATE team15_certificate
WITH SUBJECT = 'DMDD TEAM 15' ,
EXPIRY_DATE = '2026-01-01' ;
-- symmetry key
CREATE SYMMETRIC KEY team15_sykey
WITH ALGORITHM = AES_128
ENCRYPTION BY CERTIFICATE team15_certificate ;

-- Open symmetry key
OPEN SYMMETRIC KEY team15_sykey
DECRYPTION BY CERTIFICATE team15_certificate ;

-- Encrypting the IPADDRESS
update STUDENTDETAILS
SET IPaddress = ENCRYPTBYKEY(KEY_GUID(N'team15_sykey'),IPaddress);

-- Decryption
SELECT convert(varchar,DECRYPTBYKEY(IPaddress))
FROM STUDENTDETAILS;
-- DECRYPTION CODE
SELECT convert(varchar, DECRYPTBYKEY(IPaddress)) FROM STUDENTDETAILS;
```

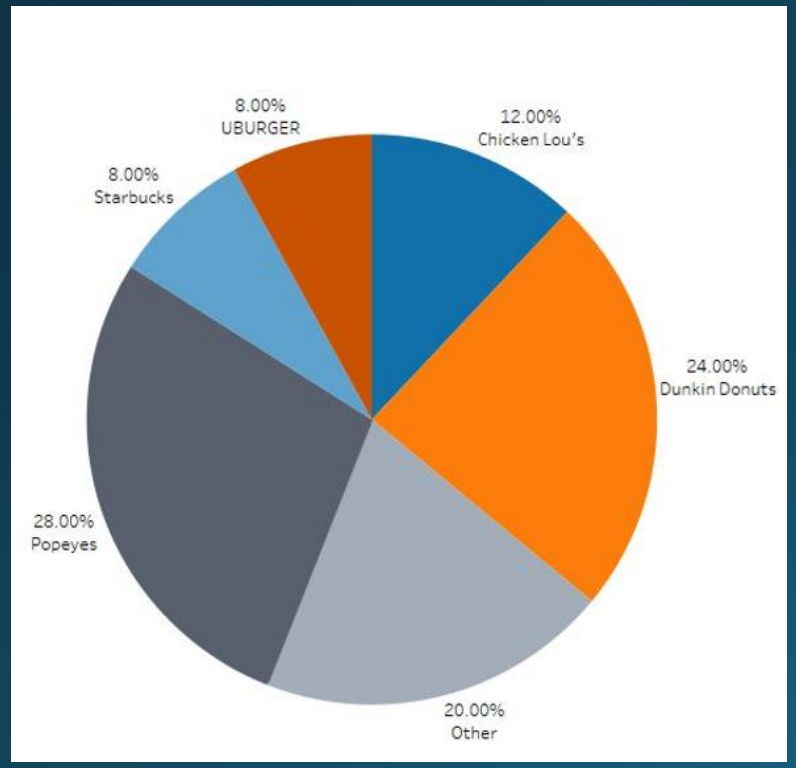
REPORTS

- Determining individual rating
- If the rating is more than 7, the facility does not require improvement as per students' feedback
- If the rating is less than 7, the facility requires improvement, as per student's feedback

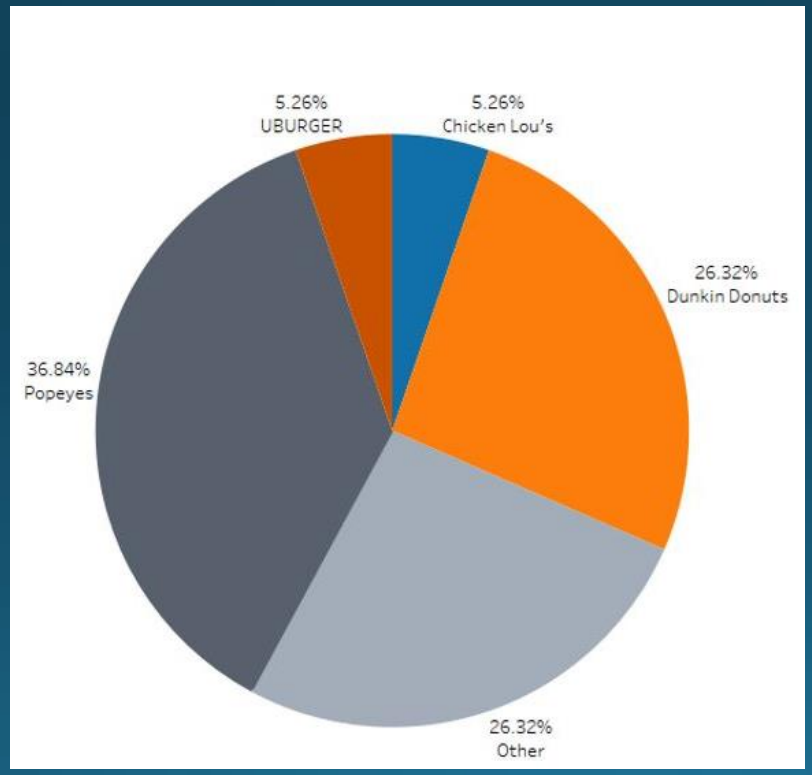


REPORT ON FOOD JOINTS

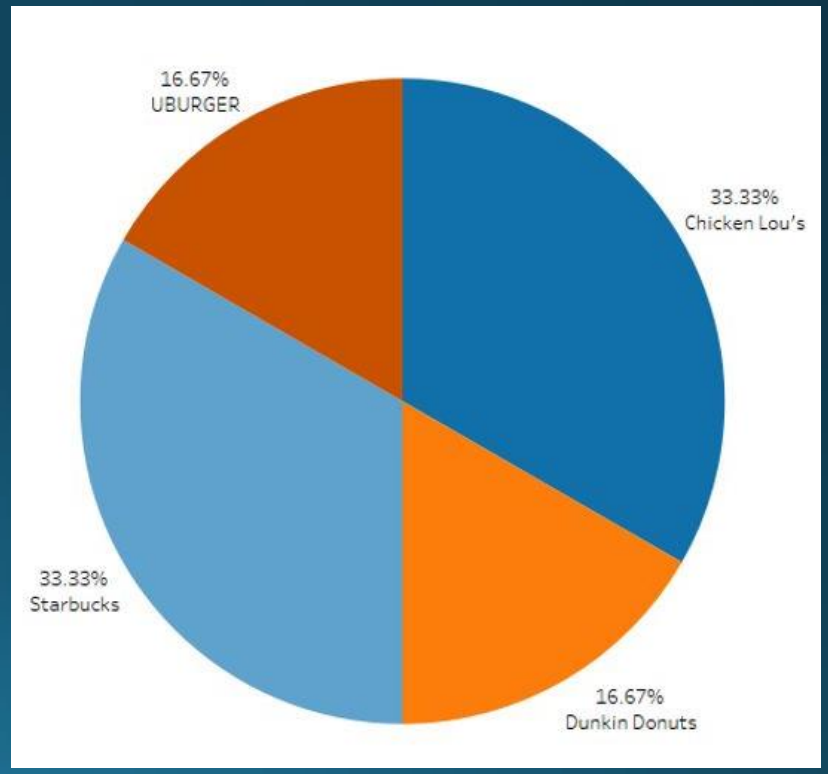
ALL FOOD JOINTS.
TOP JOINTS: Popeyes, Dunkin



LESS THAN 10$
TOP JOINTS: Popeyes, Dunkin



GREATER THAN 10$
TOP JOINTS: Starbucks, Chicken Lou's

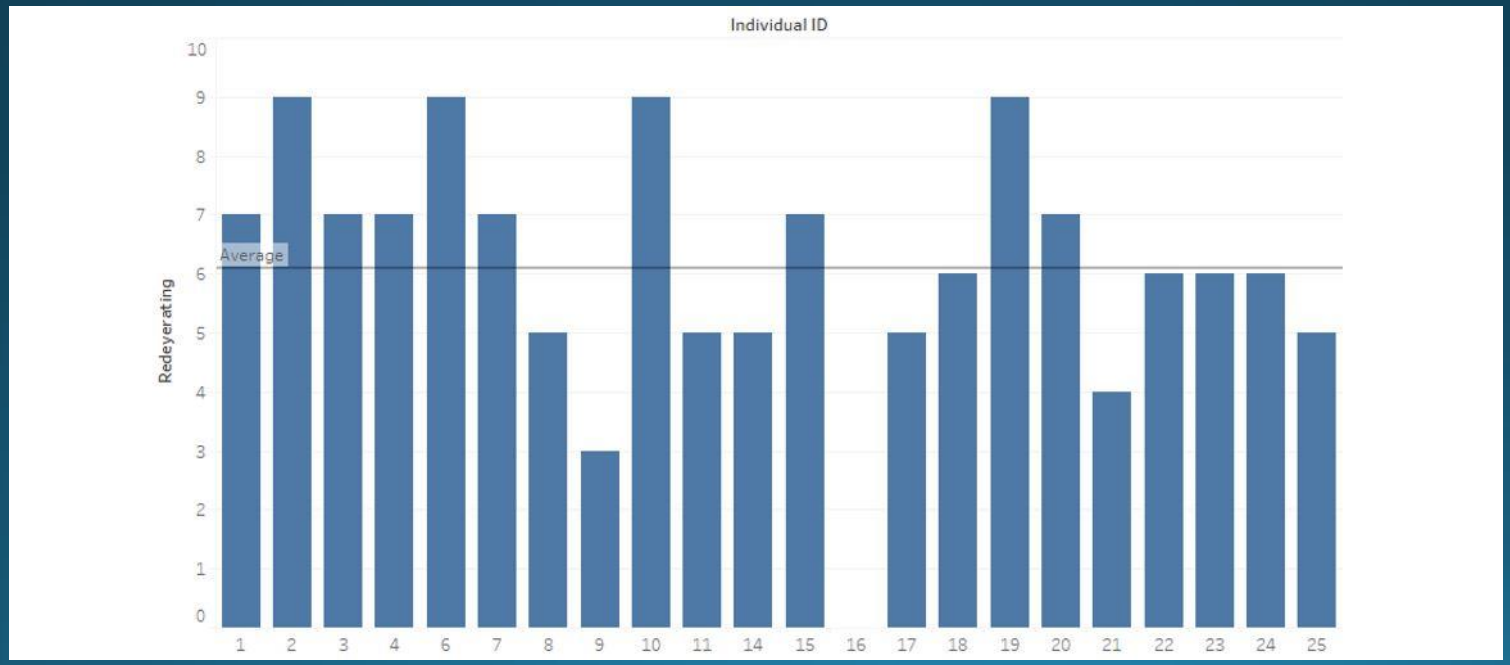


REPORT ON TRANSPORTATION

DETERMINING MODES OF TRANSPORTATION USED BY STUDENTS THAT CAN ACCESS RED EYE (<2 MILES)

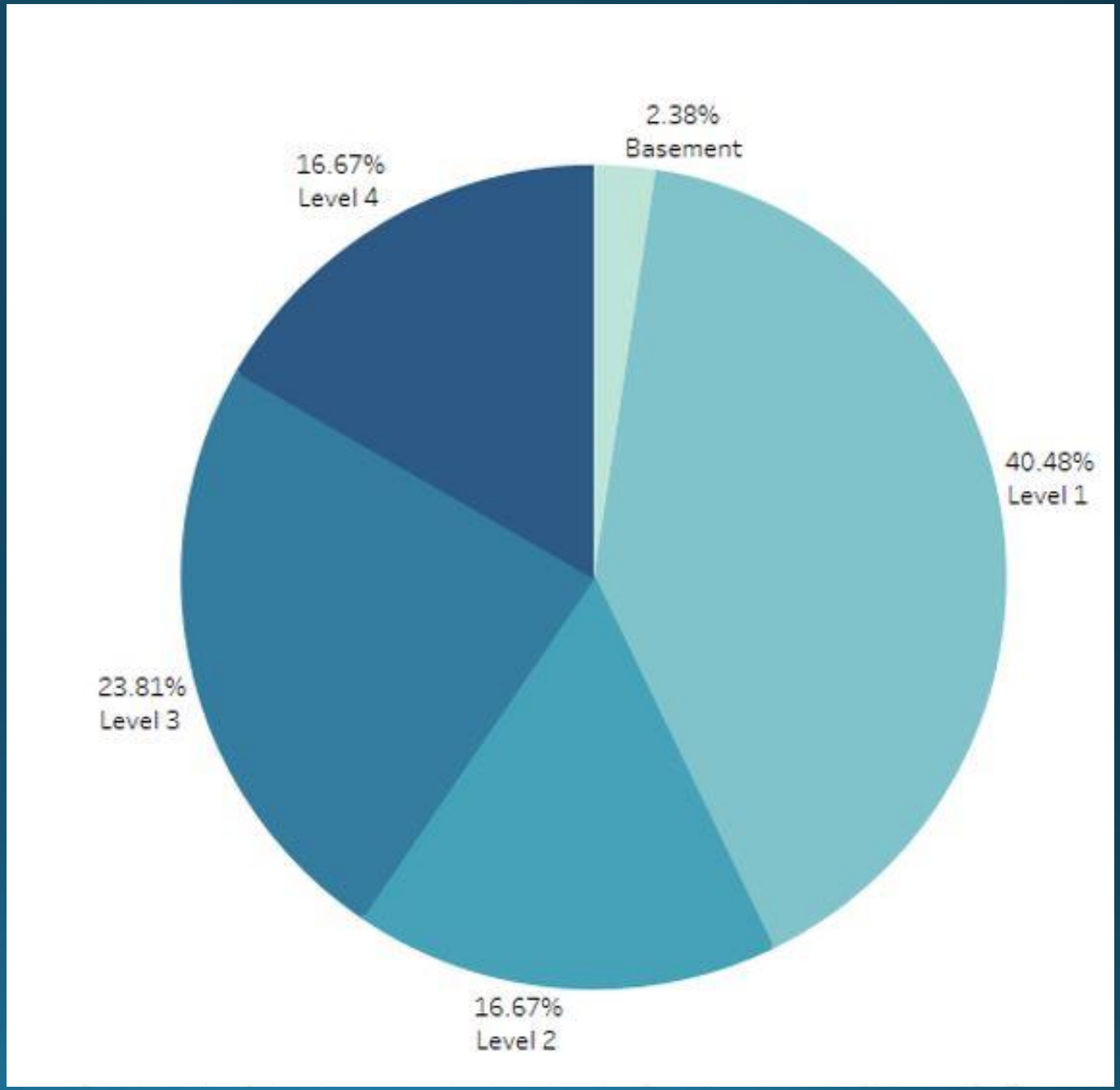
	Student ID																					
Modes	1	2	3	4	6	7	8	9	10	11	14	15	16	17	18	19	20	21	22	23	24	25
Bike															★		★					
Bus			★	★		★																★
Car															★			★				
Shuttle Ser..											★										★	
Train			★				★			★					★			★				★
Walk	★	★		★	★		★	★	★		★	★	★	★	★	★	★		★	★	★	

REDEYE RATING FOR EACH STUDENT DISPLAYED ABOVE



LIBRARY

- Determining the distribution of students between each level in the library
- **Most used level:** LEVEL 1
- **Least used level:** Basement (classrooms)



THANKYOU