Tutorial 2.1
List, Map, High-Order Methods

Overview

- You will be doing online collaborative coding to solve the problem given in this activity.
- You will be coding in Dart programming language.
- The goal of this exercise is to learn some key features in Dart programming language, i.e. as stated in the title of this exercise

Breakout Sessions

- I will split the main meeting room on Webex into several rooms. Each room will have 3 or 4 members.
- You will be assigned to a room. See the attached file to find which room you belong to.
- Do introduce yourself to your room members before getting started.
- Turn on your webcam only during the introduction session. After that, turn off the webcam to reduce network traffic.

Collaborative Coding

- Before getting started, watch the video about how to use Live Share for doing conducting collaborative coding. Video link: https://youtu.be/s9hfONtUcR8
- In each room, appoint one member to be the host. The host member will initiate a session for collaborative coding using Live Share.
- Other members will be invited as collaborators.
- All members (host and collaborators) will need to open VS Code.
- The host member will also need to share his/her screen via Webex.

Problem

Given in Table 1, the scores earned by students for a course.

Table 1: Student scores

Student Matric Number	Score
A16EC4041	57
A16EC4042	85
A18CS4056	66
A16EC9043	80
A16EC4002	57
A16EC4032	75
A16EC3002	85
A16EC3003	82
A16EC4043	83
A16EC4044	84
A16EC3004	67
A16EC4045	70
A16EC4040	53

Write the code (in Dart programming language) to accomplish the following tasks:

1. Store this data as a **`Map`**. Refer to the lecture slide for some guides.
2. Using the **`forEach()`** method, print the list. Refer to resource #1 for some guides.

Output

```
Matric          Score
------          -----
A16EC4041       57
A16EC4042       85
A18CS4056       66
A16EC9043       80
A16EC4002       57
A16EC4032       75
A16EC3002       85
A16EC3003       82
A16EC4043       83
A16EC4044       84
A16EC3004       67
A16EC4045       70
A16EC4040       53
```

3. Define a function that determines the grade from a score. Use the following conversion table. Refer to the lecture slide for some guides.

Score range	Grade
85 – 100	A
75 – 84	B
65 – 74	C
50 – 64	D
0 - 49	E

4. Print the score and grade earned by a student. Use an hard-coded matric number for the student.

Output:

```
Result for the student 'A16EC3004', Score: 67  Grade: C
```

5. Using the **`forEach()`** method, print all students along with their scores and grades

Output:

```
Matric          Score   grade
------          -----   -----
A16EC4041       57      D
A16EC4042       85      A
A18CS4056       66      C
A16EC9043       80      B
A16EC4002       57      D
A16EC4032       75      B
A16EC3002       85      A
A16EC3003       82      B
A16EC4043       83      B
A16EC4044       84      B
A16EC3004       67      C
A16EC4045       70      C
A16EC4040       53      D
```

6. Using the **`values`** attribute from the map you created in (1), create a list that holds the scores.

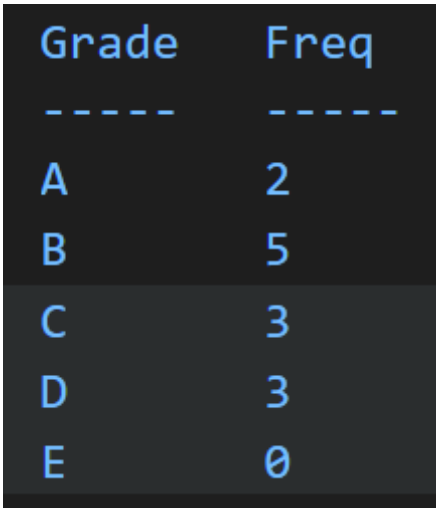
7. Then use the list (from 6) to calculate the average score. Use the higher-order method, **`reduce()`** or **`fold()`**, to achieve this. Refer to resource #1

Output

```
Average score: 72.61538461538461
```

8. Determine the frequency for each grade. Use the **`forEach()`** method to iterate all students and use a map to hold the frequencies of the grades. Then, later, solve the same problem using the the **`fold()`** higher-order method.

Output



Grade	Freq
A	2
B	5
C	3
D	3
E	0

9. Remove all students who earn grade below than B. You can use the **`removeWhere()`** high-order method to achieve this.

Output:

Matric	Score	grade
A16EC4042	85	A
A16EC9043	80	B
A16EC4032	75	B
A16EC3002	85	A
A16EC3003	82	B
A16EC4043	83	B
A16EC4044	84	B

Resources

1. **Top 10 Array utility methods you should know (Dart)**
   https://codeburst.io/top-10-array-utility-methods-you-should-know-dart-feb2648ee3a2