

**DGM 6108: Programming Foundations for Digital Media
Fall 2023 - FINAL REPORT**

Exploring the relationship between my journaling habit and my sleep

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Preface

I have a personal habit of maintaining a diary. While I occasionally question the value of this habit, I believe it contributes positively to my overall health. I am intrigued to understand the extent to which keeping a diary influences my sleep patterns. This analysis aims to inform adjustments in my future time management and identify a model that optimizes the associated benefits.

My hypothesis

By increasing the time journaling, the quality of my sleep will improve. The more time I spend journaling before bedtime, the longer I tend to sleep, and the higher the quality of my sleep. (The longer the journaling duration, the longer the sleep duration, and the higher the mood evaluation scores. This suggests a positive correlation between journaling duration, sleep duration, and mood evaluation scores, indicating a higher sleep quality.)

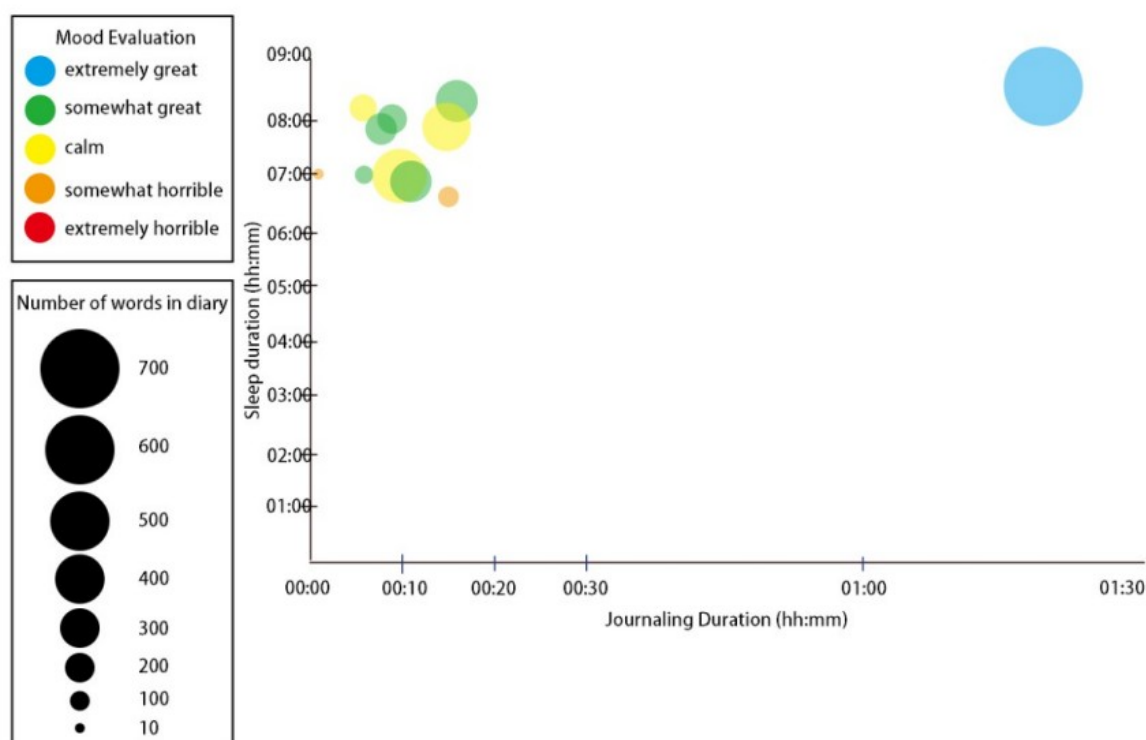
Choice of visualization format and data items

During the drafting stage, considering that I had four types of data, I came up with three sketches, including two visual graphics, namely bubble plot and radial chart. Inspired by the Circular Column Graph at

https://datavizcatalogue.com/methods/radial_column_chart.html, this visualization uses an interactive radial chart to explore relationships between data elements.

However my data was different from this, I didn't imitate all the forms. Let's analyze the advantages and disadvantages of each.

<https://digitalmedia.neu.edu/6108huyea/term/sketches/final/>



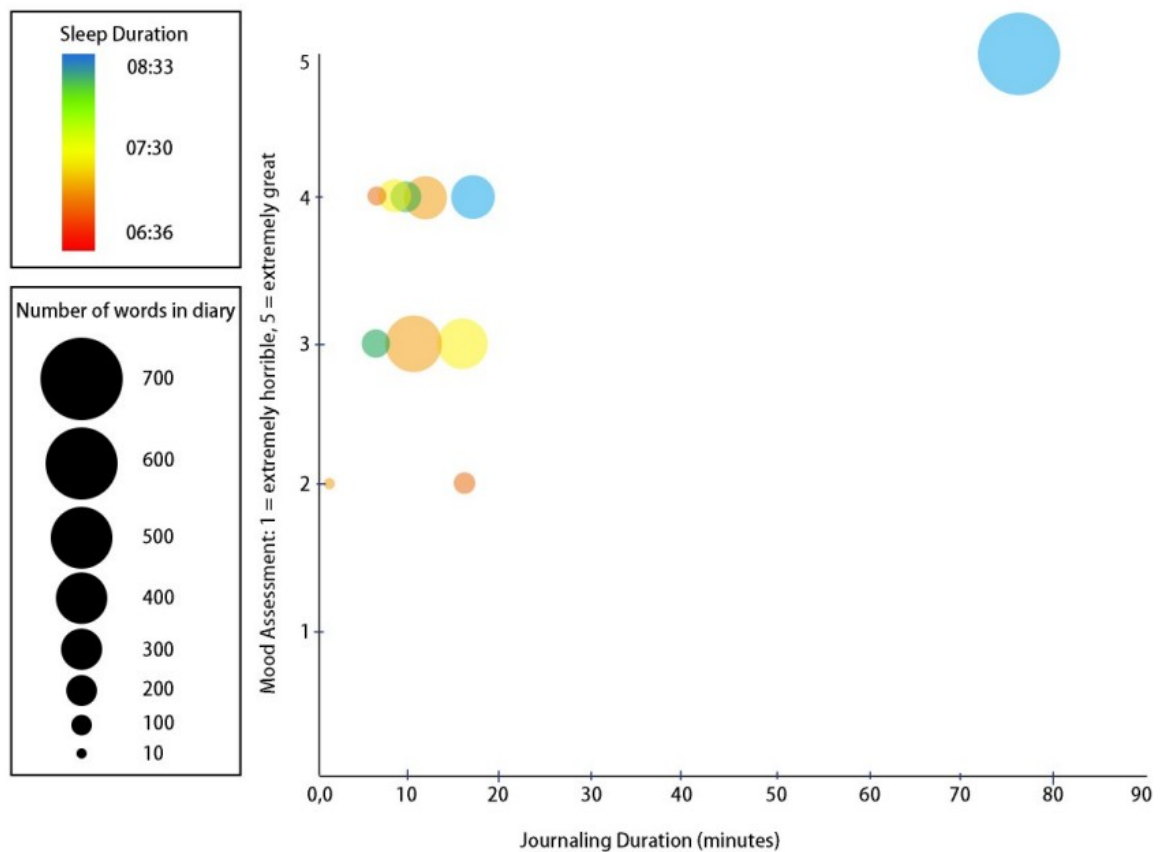
Sketch #1: Bubble plot

Advantages:

- Clear representation: The bubble plot provides a straightforward visualization of the relationships between journaling duration, sleep duration, mood evaluation, and the number of words in the diary.
- Comprehensive information: The use of multiple data elements, such as color, size, and position, allows for a detailed analysis of the factors influencing sleep and mood.

Disadvantages:

- Limited scale: The visualization may not capture subtle variations in data due to the limited scale of the axes.
- Potential complexity: The inclusion of multiple data elements might make the plot complex, potentially making it harder to interpret.



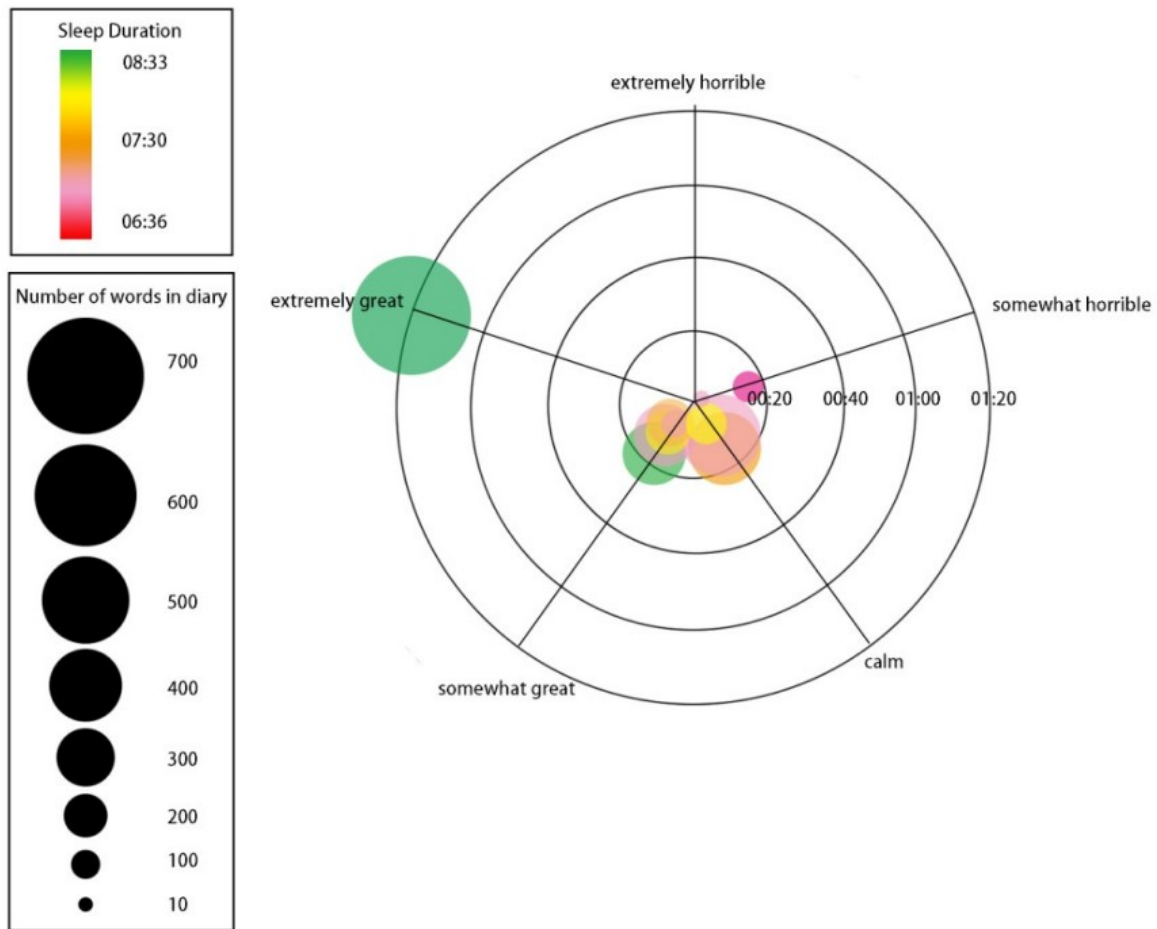
Sketch #2: Bubble plot

Advantages:

- Focus on key relationships: This visualization specifically targets the relationship between journaling duration and mood evaluation, simplifying the focus for analysis.
- Inclusion of sleep duration: The use of color to represent sleep duration adds an extra layer of information, allowing for a more nuanced interpretation.

Disadvantages:

- Limited information: While the plot captures the relationship between journaling and mood, it may lack the depth provided by additional factors like sleep duration and the number of words in the diary.
- Potential for misinterpretation: Depending on the viewer's familiarity with the color-coding system, there might be room for misinterpretation.



Sketch #3: Radial chart

Advantages:

- Innovative design: The radial chart offers a unique and visually appealing representation of the data, providing a different perspective on the relationships.
- Comprehensive overview: The inclusion of radial dividers, color intensity, and circle size creates a holistic representation of variations mood, sleep duration, journaling duration, and word count.

Disadvantages:

- Potential complexity: The radial chart might be challenging for some viewers to interpret, especially those unfamiliar with this type of visualization.

- Limited scalability: Depending on the quantity of data points, the radial chart might become cluttered and less effective in conveying information.

In summary, each sketch has its strengths and weaknesses. The choice between them would depend on the specific goals of the analysis and the preferences of the audience. If simplicity and clarity are crucial, Sketch #2 might be preferred. If a more detailed and innovative representation is desired, Sketch #3 could be the better option. Sketch #1 strikes a balance between the two but may face challenges with potential complexity.

I have opted for a bubble plot for visualization as I find it to be the most intuitive and efficient method for accurately representing the data. Bubble plots are a widely accepted and universal chart type that is easy to understand. Bubble plot offers an intuitive way to establish connections between different variables, making it easier for the audience to grasp patterns in the data.

The reason for not choosing radial charts is mainly due to the Scalability of bubble plots. Bubble plots are more easily scalable when there are a large number of data points, while radial charts might become cluttered and challenging to interpret with an abundance of data points. And the reason for not executing Sketch3 is because all the data being close to the center makes it hard to see the differences, so the visualization may not be that good.

I currently plan to continue implementing Sketch 1, because his hypothesis interests me the most, so I want to implement it.

In addition, the bubble plot of Sketch 1 is more interesting and has other advantages, including Comprehensive Data Presentation. Sketch #1 provides a more comprehensive display of data, encompassing multiple factors influencing sleep, including journaling duration, sleep duration, mood evaluation, and diary word count. In contrast, Sketch #2 focuses more narrowly on the relationship between journaling duration and mood evaluation, omitting some dimensions.

Also, the visualization in Sketch #1 contains more information, aiding in a more holistic understanding of how the relationship between journaling duration and sleep, among other factors, influences mood assessment. This richness in data can contribute to deeper insights.

In summary, the strengths of Sketch #1 lie in its ability to provide a more comprehensive, detailed data display suitable for scenarios where a thorough

consideration of multiple factors and in-depth analysis is needed. However, the specific choice depends on the questions you are interested in and the goals of your data analysis.

The visualization will function a bubble plot, with the X-axis depicting the duration of journaling and the Y-axis representing sleep duration. Each circle's color will signify mood evaluation, while the circle's size will reflect the word count of the corresponding diary entry.

An overview of the data

All my data sources can be taken out directly from the mobile phone system, which means that the mobile phone will automatically record it, so it is very convenient to use.

I collected data for a total of 53 days, gathering information once per day. The overview of the data collected for this project involves insights into the diary-keeping habit, sleep patterns, and mood evaluation scores. The primary goal is to explore the correlation between journaling duration, sleep duration, and mood evaluation scores. The chosen visualization format is a bubble plot, with the X-axis representing journaling duration, the Y-axis indicating sleep duration, circle color signifying mood evaluation, and circle size reflecting word count.

I think I can draw preliminary conclusions from the current data, but because the data is not very comprehensive, more data may be needed to verify my hypothesis.

The tabular version of this data is in Table 1 under the Appendix.

Journaling Duration (X-axis):

- Type: Objective, Continuous numerical data.
- Units: Minutes.
- Reason for Collection: To understand the relationship between the time spent journaling and its potential impact on sleep quality.
- How to collect: Using my phone data to track my time journaling on the “Note” app.

Sleep Duration (Y-axis):

- Type: Objective, Continuous numerical data.
- Units: Minutes.

- Reason for Collection: To understand the relationship between the time spent journaling and its potential impact on sleep quality.
- How to collect: Using the “Health” app on my iPhone to record the sleep duration

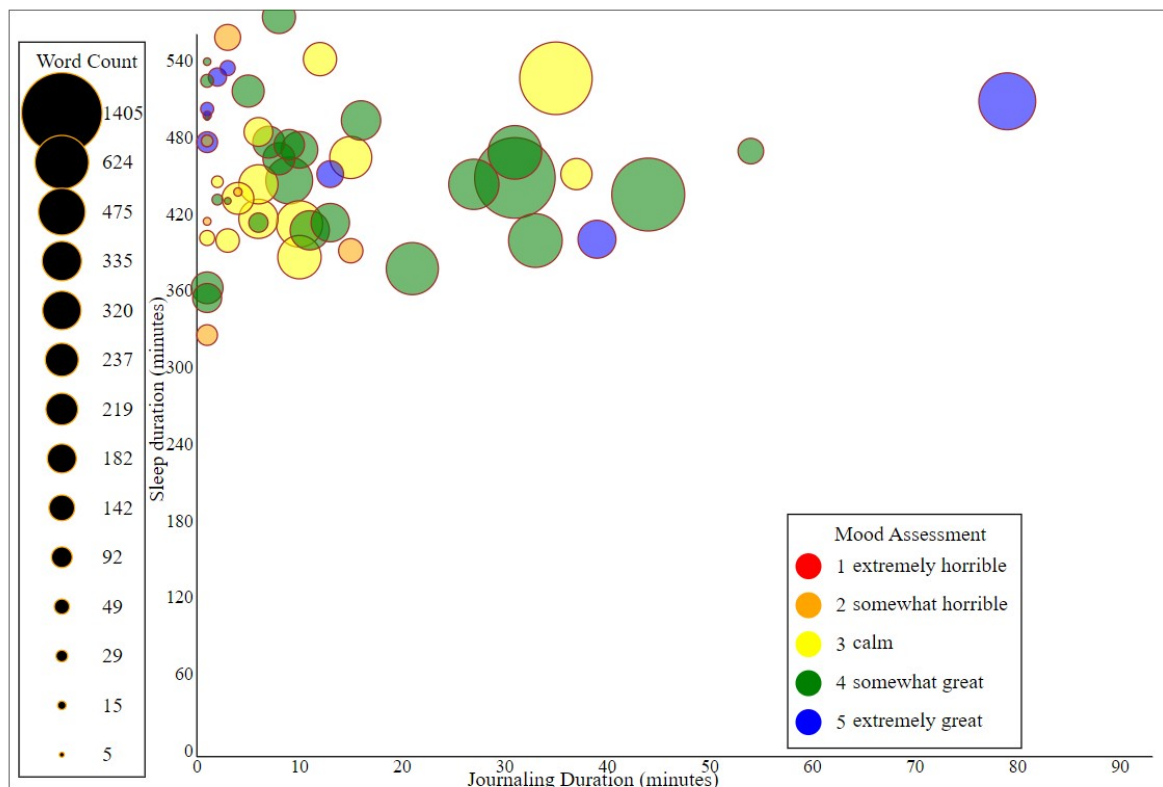
Mood Evaluation (Circle Color):

- Type: Subjective, Categorical data.
- Values: Typically ranged from 1 to 5 (e.g., 1 = extremely horrible; 2 = somewhat horrible; 3 = calm; 4 = somewhat great; 5 = extremely great)
- Descriptors: 1 = Feeling overwhelmed, distressed, and utterly unhappy; 2 = Experiencing discomfort, sadness, and unease, but not as intense as the lowest point; 3 = Sensing tranquility, a lack of extreme emotions, and a general sense of calmness; 4 = Experiencing contentment, satisfaction, and a sense of well-being; 5 = Feeling ecstatic, joyful, and on top of the world.
- Reason for Collection: To assess the mood associated with each journal entry.
- How to collect: Based on my perceived mood after I woke up.

Word Count (Circle Size):

- Type: Objective, Continuous numerical data.
- Units: Number of words.
- Reason for Collection: To explore the relationship between the length of journal entries and other variables.
- How to collect: Using Word to count words

Results



<https://digitalmedia.neu.edu/6108huyea/term/final/>

Most circles in the bubble plot are concentrated within the 20-minute duration range of journaling, revealing a pattern where variations in sleep duration appear relatively small. This concentration, however, raises questions about the dataset's comprehensiveness, suggesting the necessity for further data collection to capture a more accurate representation. While the observation hints at a positive relationship between journaling duration and sleep quality, it's essential to note that the correlation lacks robustness.

An intriguing anomaly arises when examining the instance with the longest journaling duration, which, despite not correlating with the longest sleep duration, is accompanied by a higher mood evaluation score. Additionally, a general trend emerges, indicating that mood assessments for journaling durations between 10 and 50 minutes consistently receive a 4-point rating. Conversely, for journaling durations below 20 minutes, a portion of mood assessments is rated at 3 points.

Reflection

In the evolution of the original idea, I initially believed that engaging in diary writing before bedtime would significantly and positively impact my mood. However, the analysis of the data reveals that the observed effect is not as pronounced as initially

anticipated. This discrepancy emphasizes the nuanced nature of the relationship between journaling and mood, prompting a reevaluation of assumptions.

Similarly, my initial belief that a longer sleep duration would correlate with higher mood evaluation scores, indicative of better sleep quality, is challenged by the recorded data. Contrary to expectations, there is no significant correlation between mood evaluation scores and the length of sleep duration. This unexpected finding prompts reflection on the multifaceted factors influencing sleep quality and mood, encouraging a more holistic exploration in future data collection.

I want to continue to explore how to achieve good sleep quality. The data that can be collected include daily exercise time, steps walked, caffeine intake, hours in the sun, time to go to bed, screen time on devices, social interactions (both in-person and online), etc., so that I can analyze how this data correlates with sleep

Conclusion

Maintaining faith in the original hypothesis, I acknowledge the need for further data collection over an extended period to solidify this conclusion. The current dataset, while offering insights, presents limitations that underscore the importance of a more comprehensive exploration.

In conclusion, this project serves as a journey of self-discovery through data analysis, challenging assumptions, and highlighting the need for continuous exploration. The evolving nature of the research emphasizes the importance of refining hypotheses, collecting more comprehensive data, and embracing the complexity of understanding the interplay between journaling, sleep, and mood in the quest for personal well-being.

Appendix

Date	Journaling Duration (hh:mm)	Number of words in diary	Sleep duration (hh:mm)	Mood assessment
22 Oct	00:15	384	07:49	3

23 Oct	00:10	465	06:57	3
24 Oct	00:16	335	08:18	4
25 Oct	01:19	701	08:33	5
26 Oct	00:15	128	06:36	2
27 Oct	00:06	179	08:09	3
28 Oct	00:09	201	07:59	4
29 Oct	00:08	222	07:48	4
30 Oct	00:06	80	06:58	4
31 Oct	00:11	332	06:52	4
1 Nov	00:01	13	06:59	2
2 Nov	00:13	154	07:36	5
3 Nov	00:07	220	08:01	4
4 Nov	00:54	142	07:54	4
5 Nov	00:27	547	07:28	4
6 Nov	00:10	408	06:31	3

7 Nov	<i>00:06</i>	<i>333</i>	<i>07:01</i>	<i>3</i>
8 Nov	<i>00:33</i>	<i>624</i>	<i>06:44</i>	<i>4</i>
9 Nov	<i>00:02</i>	<i>72</i>	<i>08:52</i>	<i>5</i>
10 Nov	<i>00:01</i>	<i>49</i>	<i>06:46</i>	<i>3</i>
11 Nov	<i>00:02</i>	<i>29</i>	<i>07:30</i>	<i>3</i>
12 Nov	<i>00:01</i>	<i>92</i>	<i>05:30</i>	<i>2</i>
13 Nov	<i>00:01</i>	<i>94</i>	<i>08:01</i>	<i>5</i>
14 Nov	<i>00:02</i>	<i>25</i>	<i>07:16</i>	<i>4</i>
15 Nov	<i>00:01</i>	<i>15</i>	<i>08:22</i>	<i>5</i>
16 Nov	<i>00:01</i>	<i>5</i>	<i>08:20</i>	<i>4</i>
17 Nov	<i>00:06</i>	<i>332</i>	<i>07:28</i>	<i>3</i>
18 Nov	<i>00:10</i>	<i>291</i>	<i>07:55</i>	<i>4</i>
19 Nov	<i>00:13</i>	<i>320</i>	<i>06:58</i>	<i>4</i>
20 Nov	<i>00:01</i>	<i>30</i>	<i>08:02</i>	<i>5</i>
21 Nov	<i>00:01</i>	<i>37</i>	<i>08:27</i>	<i>5</i>

22 Nov	00:01	218	06:07	4
23 Nov	00:03	145	09:23	2
24 Nov	00:03	119	06:44	3
25 Nov	00:01	12	09:04	4
26 Nov	00:31	622	07:53	4
27 Nov	00:31	1405	07:33	4
28 Nov	00:39	312	06:45	5
29 Nov	00:03	10	07:15	4
30 Nov	00:37	211	07:36	3
1 Dec	00:04	15	07:22	2
2 Dec	00:01	36	08:49	4
3 Dec	00:21	588	06:22	4
4 Dec	00:04	219	07:17	3
5 Dec	00:05	223	08:41	4
6 Dec	00:01	28	08:02	3

7 Dec	00:12	239	09:06	3
8 Dec	00:08	237	09:39	4
9 Dec	00:35	1138	08:51	3
10 Dec	00:44	1151	07:20	4
11 Dec	00:09	475	07:31	4
12 Dec	00:01	182	05:59	4
13 Dec	00:03	49	08:59	5

Reference

1." Radial Column Chart" The Data Visualisation Catalogue,
https://datavizcatalogue.com/methods/radial_column_chart.html

By attaching this statement to my work, I certify that the work submitted follows all guidelines from the Academic Integrity Statement that I signed at the start of this course and all Academic Integrity guidelines in the Northeastern Student Handbook. In developing this work, I have only used starter code specifically allowed by this assignment. I have not looked at the source code for any other students' projects on the digitalmedia.northeastern.edu server. Even if I have worked with any other students to figure out how to do an assignment, my code and comments are written entirely by me. I have not used any form of AI program (such as ChatGPT or Github CoPilot) to generate code used in this project. I have not copied code from any other online or offline resources. If I have received any assistance on my code from anyone, I have included a code comment that identifies the code that the person helped with and specifically how they helped. If this assignment has required me to research any coding techniques or syntax, I have cited my learning sources in a code comment that also identifies where this syntax or technique is used. I have otherwise tried to use only JavaScript techniques and syntax introduced in this course and its assigned materials