University of Barishal

Course name:
Computer Fundamentals and Office Applications.

Project on:
Correlation Between Hours Studied and Grades.

Submitted to:
Md. Rashid Al Asif
Assistant Professor
Department of Computer Science and Technology
University of Barishal.

Submitted by:
Chandan Kumer Sarker
Roll: 01-051-09
Batch: 51
Submission Date: 14th December 2024

Contents

Project Data (Sample of 100 entries)

Correlation Between Hours Studied and Grades		
Student ID	**Hours Studied**	**Grade**
1	39	87.64279672
2	29	57.67366904
3	15	4.926686013
4	43	87.68061343
5	8	0
6	21	44.28904463
7	39	82.8184057
8	19	46.02458239
9	23	39.12661053
10	11	43.00527774
11	11	9.8669642
12	24	40.64614791
13	36	77.34459983
14	40	82.69913363
15	24	46.72195062
16	3	0.271802345
17	22	48.00104218
18	2	8.474336067
19	24	53.61343107
20	44	88.20968058
21	30	40.48934517
22	38	76.65240355
23	2	0
24	21	42.38226509
25	33	63.37908437
26	12	23.88787234
27	22	41.26098453
28	44	100
29	25	49.33646316
30	49	69.82613873
31	27	38.60249606
32	42	78.93839843

33	28	58.28037689
34	16	22.90389152
35	15	30.67421512
36	47	82.56125131
37	44	78.14171309
38	3	17.73771203
39	37	82.32145142
40	7	0
41	21	32.55173638
42	9	10.94036283
43	39	89.88045665
44	18	28.54887672
45	4	0
46	25	47.85873977
47	14	10.05272732
48	50	72.49147657
49	9	6.537496425
50	26	42.00707388
51	2	13.22112353
52	20	56.33335391
53	28	31.34761784
54	47	100
55	7	6.827738878
56	44	71.56564432
57	8	22.13081539
58	47	92.82255212
59	35	62.22857035
60	14	32.0175737
61	17	32.19942552
62	36	85.4550141
63	50	63.95506642
64	40	95.3364674
65	4	0
66	2	31.0478441
67	6	8.296033564
68	42	75.63582913
69	4	4.195214878
70	29	37.81976302
71	18	38.85501089
72	26	69.19973689
73	44	65.80429247

74	34	70.79569128
75	10	4.453520755
76	36	75.71865209
77	14	32.15743173
78	31	76.78461678
79	48	91.74634286
80	15	23.81613517
81	8	22.61814454
82	14	13.57888024
83	23	22.79309216
84	40	70.91187925
85	21	35.42233888
86	16	30.28446738
87	45	85.62981406
88	18	39.17004211
89	47	94.81630903
90	24	44.80182854
91	26	57.24195177
92	25	48.47348603
93	45	77.40247355
94	41	88.3831839
95	29	56.80886758
96	15	28.61809924
97	45	93.64354376
98	1	0
99	25	50.48356439
100	7	27.08204326

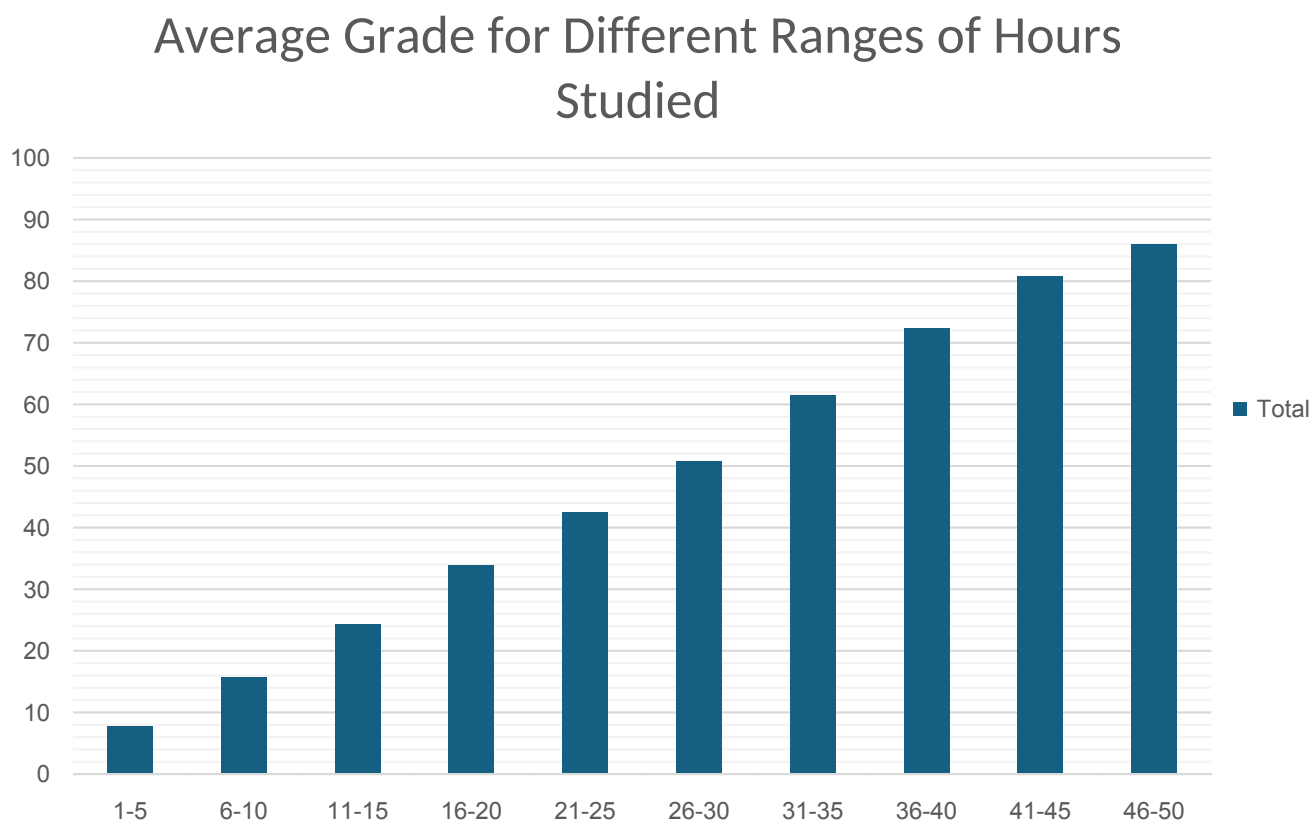
Questions:

1. What is the average grade for different ranges of hours studied?
2. What percentage of students score above 75 based on hours studied?
3. What is the minimum, maximum and average grades achieved based on the number of hours studied?
4. How does the variance in grades change as hours studied increase?

5. How does the relationship between study hours and grades vary across different performance levels (e.g., high vs. low achievers)?

1. What is the average grade for different ranges of hours studied?

Hours Studied	Average of Grade
1-5	7.705749891
6-10	15.69720071
11-15	24.20884293
16-20	33.79249179
21-25	42.52070813
26-30	50.68695758
31-35	61.4396957
36-40	72.24981022
41-45	80.83099077
46-50	85.99980813



Key Findings and Insights:

The data reveals a clear **positive correlation** between **hours studied** and **grades**. As study hours increase, the average grade improves, with a steady rise across all ranges:

- **1-5 hours** of study results in an average grade of **7.71**, while studying **46-50 hours** yields an average of **86.00**.

1. Steady Improvement with Increasing Hours:

- **Moderate study ranges** (1-30 hours) show a consistent, linear improvement in grades. For example:
  - **1-5 hours**: Average grade **7.71**.
  - **26-30 hours**: Average grade **50.69**.
- This suggests that even moderate increases in study time have a noticeable impact on performance.

2. Significant Boost After 30 Hours:

- A sharp improvement occurs for students studying more than **30 hours** per week, with grades rising from **61.44** (31-35 hours) to **85.99** (46-50 hours). This indicates that intensive studying yields significant gains.

3. Diminishing Returns Beyond 40 Hours:

- The increase in grades slows beyond **40 hours** of study, with smaller jumps between ranges. For instance:
  - **41-45 hours**: Average grade **80.83**.
  - **46-50 hours**: Average grade **85.99**.
- This indicates **diminishing returns**, where more study hours yield smaller improvements, likely due to fatigue or inefficiency.

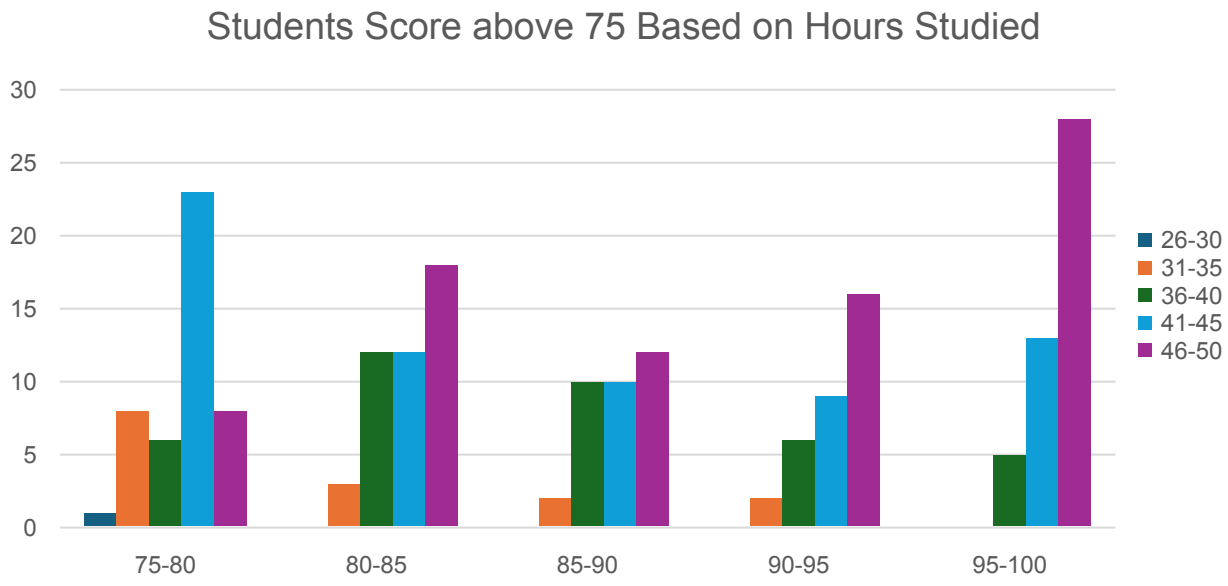
4. Implications for Study Strategy:

- The **optimal study time** appears to be **31-40 hours** per week, where grades see the most significant improvement.
- Beyond **40 hours**, students may benefit more from improving the **quality of their study sessions** rather than just adding hours.

Conclusion:
while **more study hours** generally lead to better grades, students should aim for a balance, focusing on both **quantity and quality** to maximize their academic performance.

2. What percentage of students score above 75 based on hours studied?

Count of Student ID	Column Labels					
Row Labels	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**Grand Total**
75-80	1	8	6	23	8	46
80-85		3	12	12	18	45
85-90		2	10	10	12	34
90-95		2	6	9	16	33
95-100			5	13	28	46
Grand Total	**1**	**15**	**39**	**67**	**82**	**204**



Key Findings and Insights:

The data breaks down the number of students who scored above 75 across different **study hour ranges**. Here are the key insights:

1. High Study Hours Yield More Students Scoring Above 75:

- The data shows that as the number of hours studied increases, the number of students scoring above 75 also increases significantly.
- For students studying **26-30 hours**, only **1 student** scored above 75.
- By contrast, **82 students** in the **46-50 hours range** scored above 75, representing a substantial increase in high performers with more study hours.

2. Majority of High-Scoring Students (75+) Study More Than 40 Hours:

- A notable **73% (149/204)** of the students who scored above 75 studied more than **40 hours** per week.
- This suggests that **40+ hours of study per week** is a strong predictor of high grades.

3. Sharp Increase in High Grades Beyond 30 Hours:

- Students studying **31-35 hours** had **15 high scorers**, while those studying **36-40 hours** saw this number jump to **39 students**.
- The numbers increase even more significantly for students studying **41-45 hours** (**67 students**) and **46-50 hours** (**82 students**).
- This suggests a **sharp improvement** in performance after students surpass 30 hours of study per week.

4. Top Performers Concentrated in the Highest Study Ranges:

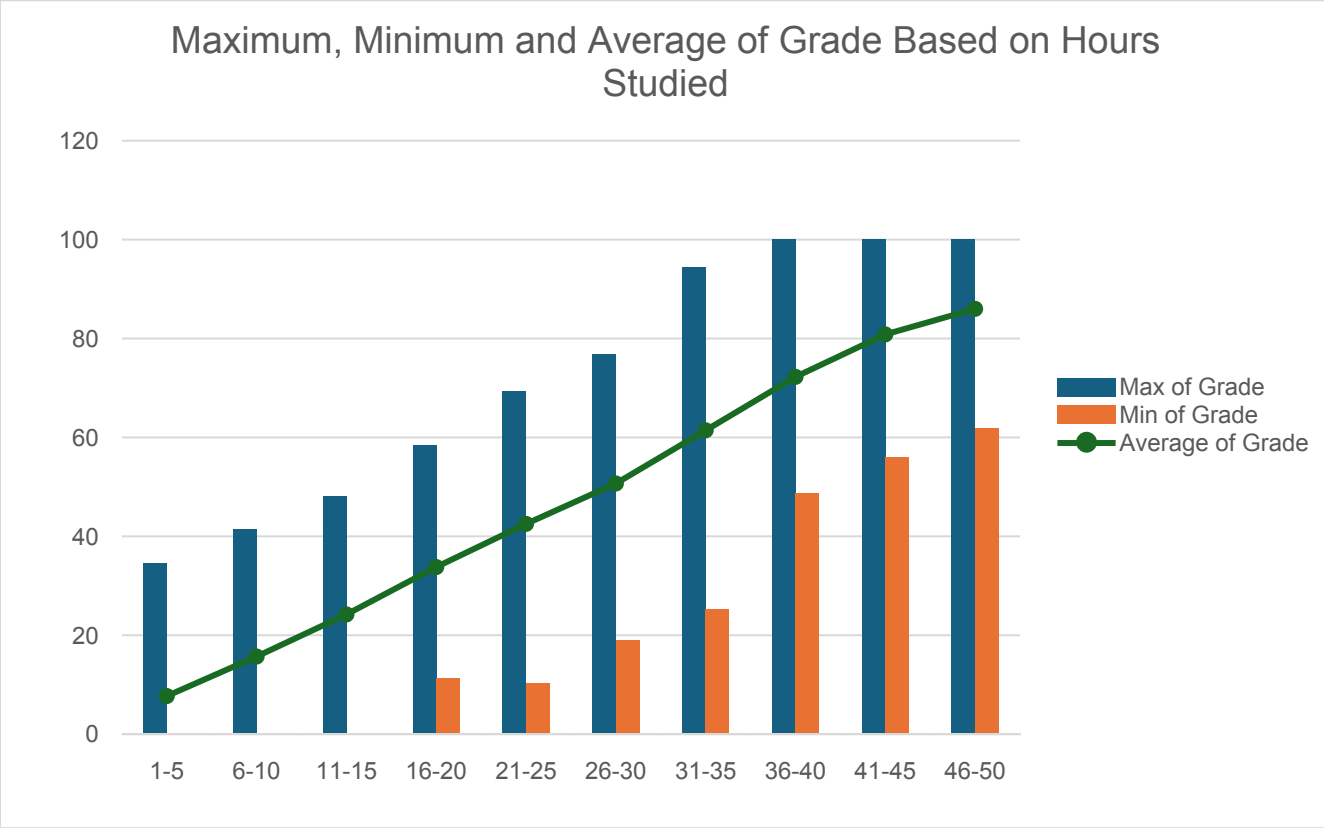
- The **top performers** (students scoring **90-100**) are overwhelmingly found in the **41-50 hours range**, with a total of **124 students** in this group.
- This indicates that the most academically successful students tend to study more intensively, with the highest concentration of top scores in the **46-50 hours range**.

Conclusion:

The data demonstrates a clear relationship between **increased study hours** and higher scores, especially for students studying more than **40 hours per week**. This suggests that students aiming for top performance (above 75) benefit significantly from dedicating at least **30-40 hours** of study, with the **46-50 hours range** yielding the highest number of top scorers.

3. What is the minimum, maximum and average grades achieved based on the number of hours studied?

Hours Studied	Max of Grade	Min of Grade	Average of Grade
1-5	34.5017822	0	7.705749891
6-10	41.36813222	0	15.69720071
11-15	48.16555388	0	24.20884293
16-20	58.36854727	11.26151154	33.79249179
21-25	69.25483529	10.26016055	42.52070813
26-30	76.84188148	18.95924128	50.68695758
31-35	94.36340922	25.26026487	61.4396957
36-40	100	48.76564064	72.24981022
41-45	100	55.97180351	80.83099077
46-50	100	61.92180325	85.99980813
Grand Total	**100**	**0**	**48.08218255**



Key Findings and Insights:

The data on **minimum**, **maximum**, and **average grades** across study hours provides key insights:

1. Maximum Grades Increase with More Study Hours:

- The **maximum grade** rises steadily with more hours studied. Students studying **36-50 hours** achieve the **maximum grade of 100**, showing that **higher study hours** correlate with reaching top scores.

2. Minimum Grades Improve After 20 Hours:

- For study ranges **1-15 hours**, the **minimum grade is 0**, indicating a higher risk of low performance.
- Beyond **20 hours**, the minimum grade improves, reaching **61.92** for students studying **46-50 hours**, reducing the chance of very low scores.

3. Average Grades Rise Consistently:

- The **average grade** improves significantly with more study hours:
  - **1-5 hours**: Average grade is **7.71**.
  - **46-50 hours**: Average grade reaches **85.99**.

- This shows a strong **positive correlation** between study hours and grades.

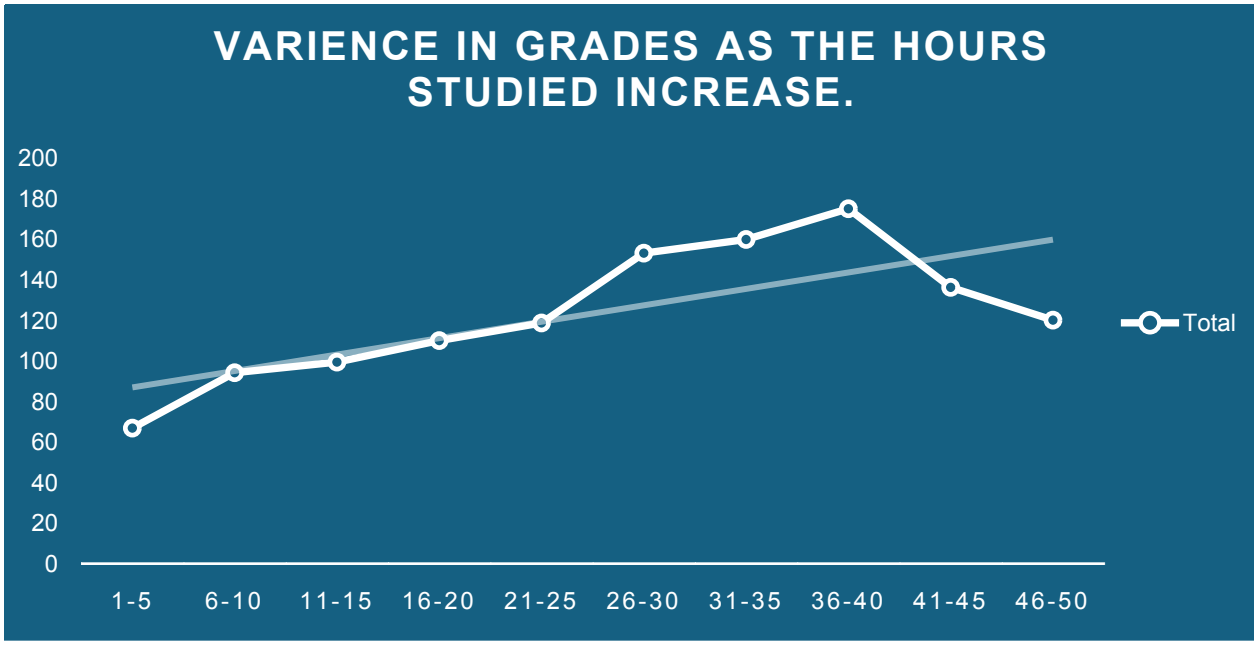
4. Significant Jump After 30 Hours:

- A major improvement is seen after **30 hours**, with average grades jumping from **50.69** (26-30 hours) to **72.25** (36-40 hours), suggesting that **30+ hours** of study per week leads to notable gains in performance.

Conclusion:
The data confirms that **more study hours** lead to **higher grades**, with significant improvements in both **minimum and average grades** after the **30-hour threshold**, making it a key point for academic success.

4. How does the variance in grades change as hours studied increase?

Row Labels	Varp of Grade
1-5	66.80499099
6-10	94.10532008
11-15	99.33380793
16-20	109.9400365
21-25	118.6254009
26-30	153.0278014
31-35	159.774277
36-40	174.9220975
41-45	136.1763932
46-50	120.0226631
Grand Total	**785.1250402**



Key Findings and Insights:

The data shows how the **variance in grades** changes with **hours studied**, providing insights into the consistency and spread of student performance across different study time ranges.

1. Increasing Variance with More Study Hours:

- Variance in grades rises steadily as study hours increase, particularly between **1-40 hours**:
  - **1-5 hours**: Variance is **66.80**, indicating more consistent (but generally low) performance.
  - **36-40 hours**: Variance jumps to **174.92**, suggesting a wider spread of grades, including both high and low performers.
- This reflects the increasing diversity in student performance as more hours are studied, with some excelling and others struggling despite longer study times.

2. Peak Variance Between 26-40 Hours:

- The highest variance is observed between **26-40 hours**:
  - **26-30 hours**: Variance is **153.03**.
  - **31-35 hours**: Variance peaks at **159.77**.
  - **36-40 hours**: The maximum variance is **174.92**.
- This suggests that during this range, students exhibit a broad spectrum of performance levels, indicating varied effectiveness of study strategies.

3. Decrease in Variance Beyond 40 Hours:

- After **40 hours**, variance begins to **decrease**:
  - **41-45 hours**: Variance drops to **136.18**.
  - **46-50 hours**: Variance falls further to **120.02**.
- This suggests that as students dedicate more time to studying beyond 40 hours, performance becomes more **consistent**, with fewer extremes in high or low grades.

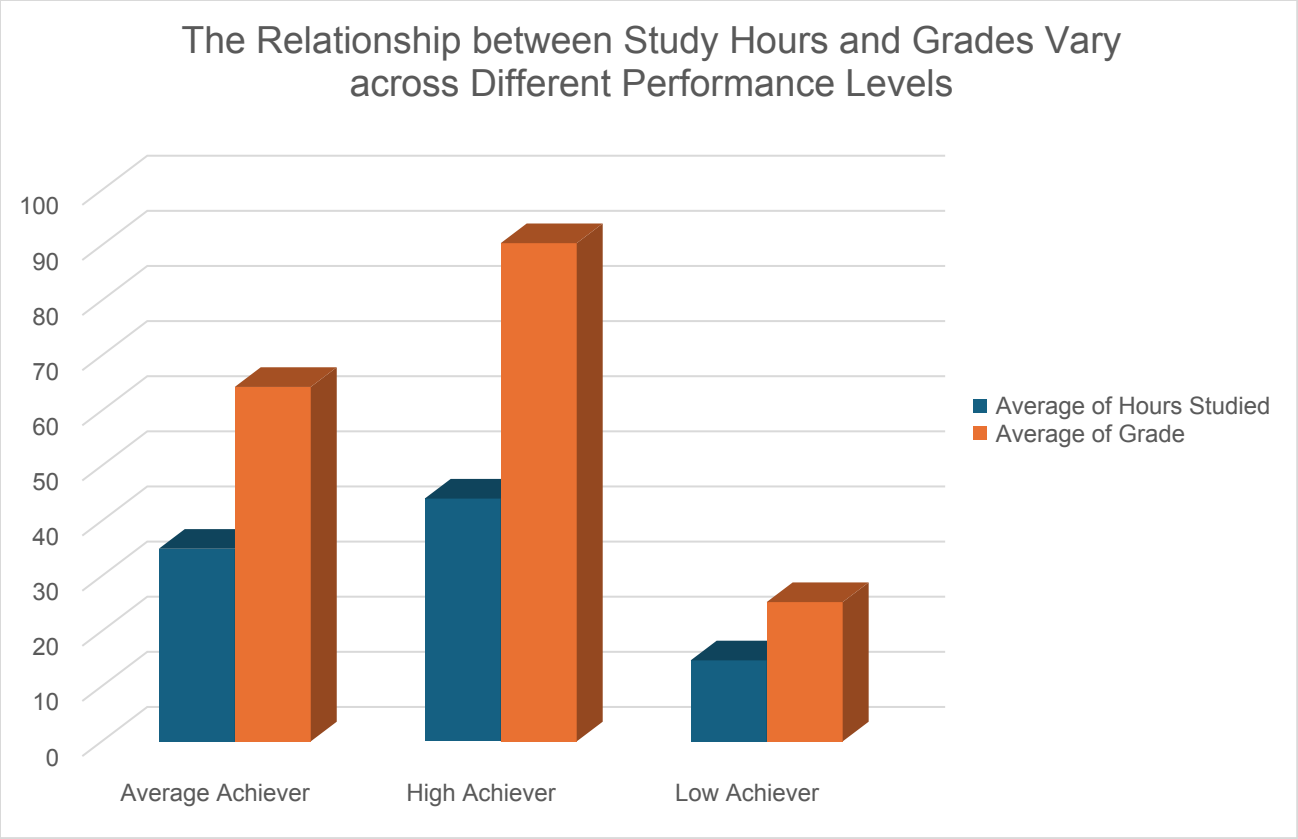
Conclusion:
Variance in grades **increases with study hours** up to around **40 hours**, reflecting more diverse performance as students spend more time studying. However, beyond **40 hours**, variance decreases, indicating that **additional study time** leads to **more consistent** results, with fewer extremes in grade distribution.

5. How does the relationship between study hours and grades vary across different performance levels (e.g., high vs. low achievers)?

Student ID	Hours Studied	Grade	Performance Level
1	39	87.64279672	High Achiever
2	29	57.67366904	Average Achiever
3	15	4.926686013	Low Achiever
4	43	87.68061343	High Achiever
5	8	0	Low Achiever
6	21	44.28904463	Low Achiever
7	39	82.8184057	High Achiever
8	19	46.02458239	Low Achiever
9	23	39.12661053	Low Achiever
10	11	43.00527774	Low Achiever
11	11	9.8669642	Low Achiever
12	24	40.64614791	Low Achiever
13	36	77.34459983	Average Achiever
14	40	82.69913363	High Achiever
15	24	46.72195062	Low Achiever
16	3	0.271802345	Low Achiever
17	22	48.00104218	Low Achiever
18	2	8.474336067	Low Achiever

19	24	53.61343107	Average Achiever
20	44	88.20968058	High Achiever
21	30	40.48934517	Low Achiever
22	38	76.65240355	Average Achiever
23	2	0	Low Achiever
24	21	42.38226509	Low Achiever
25	33	63.37908437	Average Achiever
26	12	23.88787234	Low Achiever
27	22	41.26098453	Low Achiever
28	44	100	High Achiever
29	25	49.33646316	Low Achiever

Row Labels	Average of Hours Studied	Average of Grade
Average Achiever	34.9376947	64.2963424
High Achiever	44.0443038	90.37877633
Low Achiever	14.69481766	25.26527828
Grand Total	**25.83**	**48.08218255**



Key Findings and Insights:

The data reveals how the **relationship between study hours and grades** differs across **performance levels** (high, average, and low achievers).

1. High Achievers Study More:

- **High achievers** study an average of **44 hours per week** and score an average grade of **90.38**.
- This group invests the most time in studying, which is reflected in their high performance.

2. Average Achievers:

- **Average achievers** study around **35 hours per week** and achieve a grade of **64.30**.
- They spend more time studying than low achievers but less than high achievers, resulting in moderate performance.

3. Low Achievers Study Significantly Less:

- **Low achievers** study only **14.7 hours per week** and score an average grade of **25.27**.
- This shows a clear link between fewer study hours and lower grades, suggesting insufficient time invested in studying leads to poor outcomes.

Conclusion:
The data shows a **strong positive correlation** between **study hours** and **grades** across performance levels. **High achievers** dedicate significantly more time to studying, resulting in much higher grades, while **low achievers** study far less and achieve lower scores. This highlights the importance of **study time** in driving academic success.

Final Conclusion:

This project highlights the strong relationship between **study hours** and **academic performance**, demonstrating that increased study time generally leads to better grades. Key findings show that:

1. **More study hours** result in higher **average grades**, with significant improvements observed after 30 hours of study per week.

2. **High achievers** dedicate significantly more time to studying, averaging 44 hours per week, while **low achievers** study far less, leading to lower grades.
3. The data also shows **diminishing returns** beyond 40 hours, where the improvement in grades becomes less dramatic, indicating that both **quality and quantity** of study time are important.

Ultimately, this project emphasizes the value of consistent, focused study sessions to achieve academic success. It also suggests that students should aim for a balanced approach to studying—investing enough hours while maintaining effective study habits to optimize performance.