

**University of Barishal**

Course name:

Computer Fundamentals and Office Applications.

Project on:

Correlation Between Hours Studied and Grades.

Submitted to:

**Md. Erfan**

Assistant Professor & Chairman

Department of Computer Science and Technology

University of Barishal.

Submitted by:

Hasibul Hossain

Roll: 01-033-10

Batch: 33

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# 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.