Secret of Student Academic Success

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Project Description

This project is used to determine the secret of student's academic success by considering various factors such as Alcohol Consumption, health, Romantic Life, living place, parent's education and profession. We are using "students" data set which is obtained from a Portuguese education research, it consists of Math and Portuguese course data along with student personal information.

After loading, cleaning and analyzing the given student data, we are able to answer the following questions.

- How many hours per a week student studies and also doe this number affects student final grades?
- Determine the gender and age of the students
- How many students are in love and Does romantic life of student affects their final grades?
- Count of students living in city and village.
- Does living in village/ far from college affects student grades?
- Determine student health stats and find out whether student health affects final grades?
- Number of students consuming alcohol on weekdays and weekends.
- Does consuming alcohol on weekend affects grades?
- Does consuming alcohol on weekday affects student final grades?
- Determine number of students want to go for higher studies.
- Does the desire to get higher education influence the final grades.
- How many students have internet access and does this affects student grades.
- Determine number students living with their parents and its affect on grades.
- Determine the quality of family relationships and influence on student grades.
- Does parent's education and profession helps in improving student grades.

After coding and analyzing each important attribute in data set which plays impotent role is affecting student grades using the data science related python tools we observed the following:

- We observed more students are teenagers age between 15-18, assuming that younger the student the less likely that they consume alcohol.
- We also determined number of students in love are less than the single students and romantic life affects the final grades as they spend less amount of time in studying and attending classes.
- We determined that more number of students spends 2-5 and 5-10 hours a week got good grades in final and students who spends less than 2 hours a week got poor grades.
- We found students consume alcohol on weekdays likely to get less grades in final and consuming alcohol on weekends is not affecting student grades.
- Almost all students are desired to do higher studies, stats showed students with this desire likely get good grades in final.
- Students with internet access are spending less number of hours which is impacting their grades negatively.
- This Scientific analysis shows living with family, having good family relationships and parents education and profession helps improving student grades.

Libraries used in this project

Pandas, Numpy, OS, Matplotliib.pyplot, Seaborn, Warnings, plotly.graph_objs are the libraries used with different functions and modules.

Survey

We conducted an anonymous survey with the students in our campus which was simple 5-6 questions related to their opinion on what effects their academic grades and also few questions related to COVID 19 pandemic. The main goal of doing this is to compare the responses with that of the results we achieved using our dataset.

Future Scope:

1. This project has a lot of scope to enhance the data set by considering few more attributes like Covid-19 impact on life, impact on alcohol consumption, physical and mental health.
2. Also scaling in more data of students across the universities in USA. we can prepare data set in US with more attributes.
3. Research paper on this topic can help many institutions across to reach out to their students basing the model used in our research.

Based on the current data set analysis we can take decisions like do not consume alcohol on weekdays, spend more hours to study, less time on internet, good and healthy relationship with family, Living near to school and maintain good health likely increases students grades in final.

Based on these observations we can take right decisions at right time to improve the final grades. Thanks to Data Science an Analytics!!!!

Data Set Analysis

We have an excellent data set which contains information about the life of students of academic courses and their academic success. As for our team, we are very interested to examine in detail the information about the students and find out what influences their grades the most. We are paying attention to the various factors that influences student grades. The factors included the amount of alcohol consumed by students, parent education, profession, family relation, Higher education, student health and love life.

As mentioned above we analyzed each factor which influences student grades in detailed, based on this analysis we were able to answer few of the important questions and able to help to take right decisions at right time to improve the student grades. Let us look at the data set closely.

First, let us look at the gender of our students. Count the number of boys and girls.

Gender of students : F - female,M - male
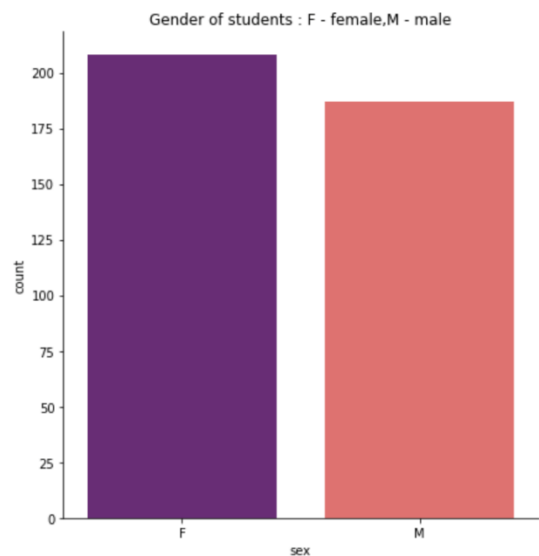
From above graph we can say female students count is little more than male students count. Now let's pay attention to the age of students.


Age of students
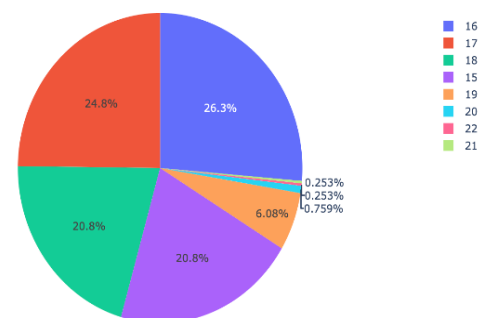
Basically we are dealing with students 15-18 years. The most beautiful, but very often is a difficult age. we assume, for example, that the younger the student the less likely that they consume alcohol. Teenagers want to relax more with friends and learn less math or other courses. Then let's see how many hours a week the students spend on their studies.

Study time
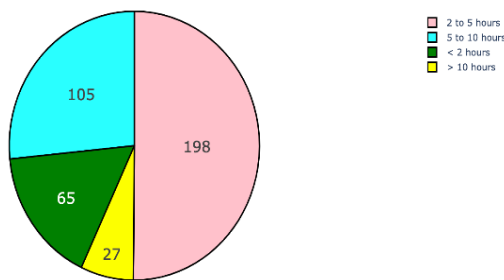
Most students spend 2 to 5 and 5 to 10 hours a week studying. It would be better if we had the exact number of hours for each student. Personally, we think a student who spends 5 hours a week studying is a diligent student. 2 hours is not always enough. But we can pay attention to the impact of the number of hours spent on study on the final grade of the student.
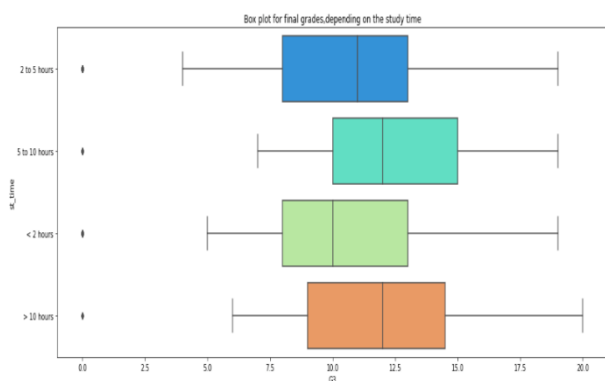

The above box plot shows the final grades depending upon the stud time per week. The lowest average result is shown by students who spend less than two hours a week studying. From this we can conclude that studying less than 2 hours a week is not enough, study more ours to get good final grades. Few students spend more than 10 hours a week studying. But they show a very good result. Sometimes we're all lazy. But we must try to find time to study and good grades will become stable.

We have information about the student's place of residence: city or village. Let's see. This may be useful to us. Perhaps students living in the city are much more likely to attend parties with alcohol or are busy with more interesting things than studying. Or students living in villages may be too

lazy to get to school and miss classes. Also display the time that students spend on the way to school (1 - very close, 4 - very far).
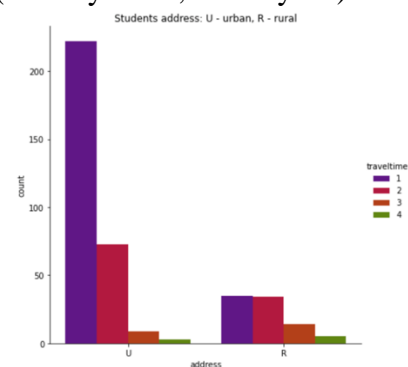
Most of the students live in the city. Few students take long to get to school. But still, let's see if this affects the number of absences.
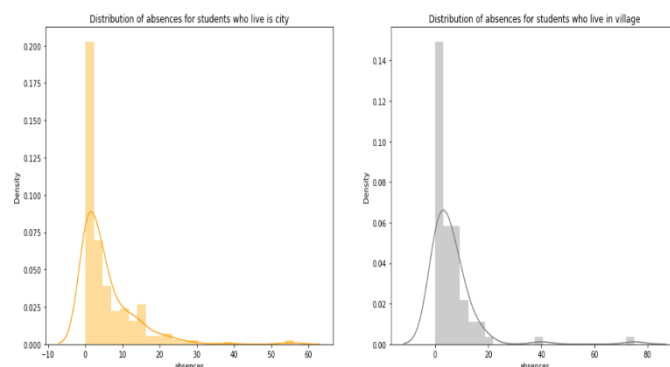

Yet among the students living in the village there are people with a lot of absences. But while we can not say for sure that this is due to the fact that the student does not live in the city. But ofcourse this may be due to traffic jams on the road or not a very good transport schedule.
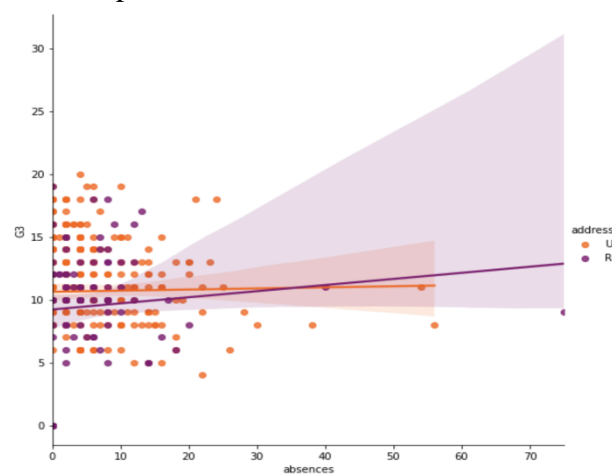

But let's study student's absences in more detail. We have information about the romantic relationships of students: there is a relationship or

not. Given the age of our students, we can assume that love has an important place in their lives. Let's see if the presence of love and relationships affects the number of absences.
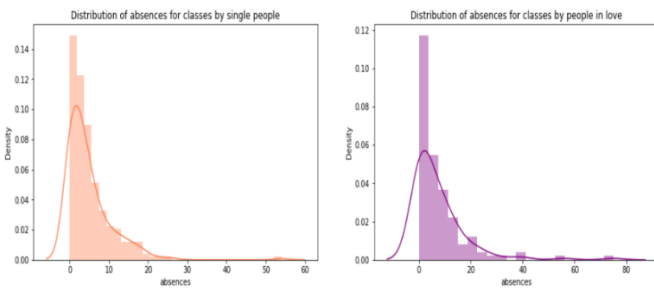
Single people miss fewer classes than students in love. Let's see if love affects the final grade of teenagers who are in love.
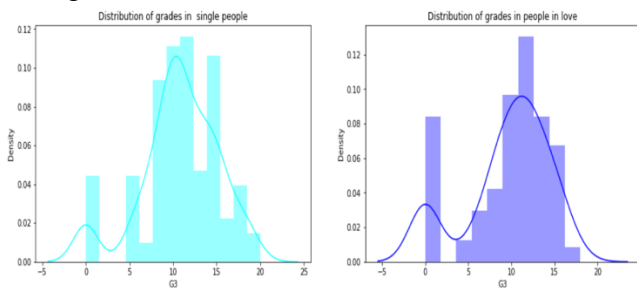

The final grades of single students are slightly higher than those who are in a romantic relationship. Of course this is due to the fact that teenagers in love want to spend more time with girlfriend or boyfriend than with a textbook[4]. Let's count the number of single students and those who are in a relationship.
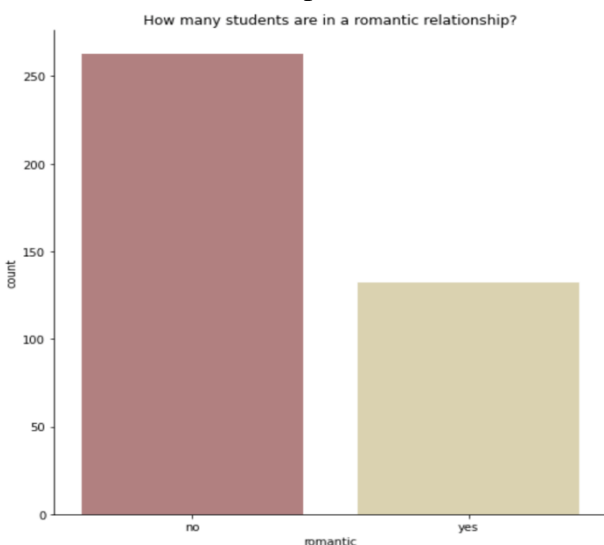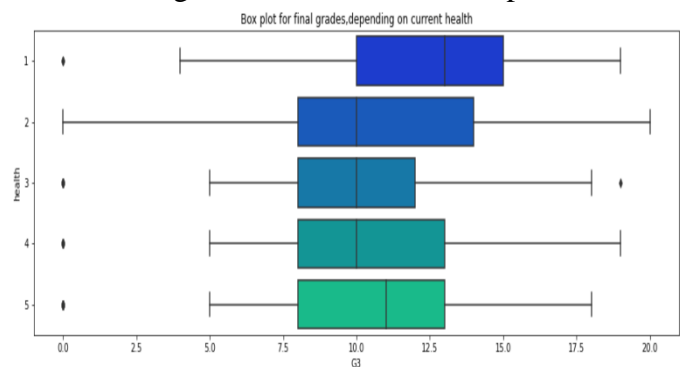

Now consider one very important thing. Students health! In our sample of very young teenagers and we hope that they all have excellent health.[5][6]
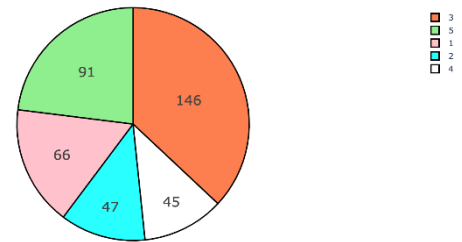

To be honest, we would like to see a completely green circle. Let's see if the health of the student affects final grades and the number of passes.


Interesting situation. In our enrollment, 66 students have very poor health. But their final estimates are quite high. I hope that they think not only about their success in school but also about health! Also, students with very good health have high final grades. Now look at the absenteeism.

There is no tangible connection between the level of health of the student and the number of absences to classes. But here you can see that students with high final grades miss less classes. Since we are talking about health will look at alcohol consumption by students. We have data on the amount of alcohol consumed by students on weekdays("Dalc") and weekends("Walc"). The main thing we are interested in is whether the amount of alcohol consumed affects success in school. Let's start with alcohol consumption on weekdays.[2] [3]

Workday alcohol consumption (numeric: from 1 - very low to 5 - very high)
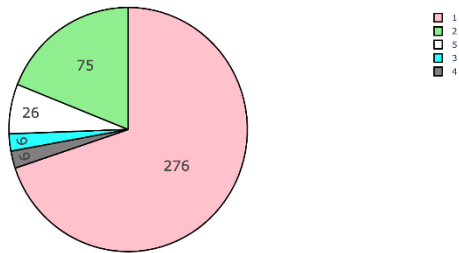
Most students prefer to spend a week sober or almost without alcohol. But still there is someone who likes to drink on a weekday. Let's see if that affects student grades and absences.
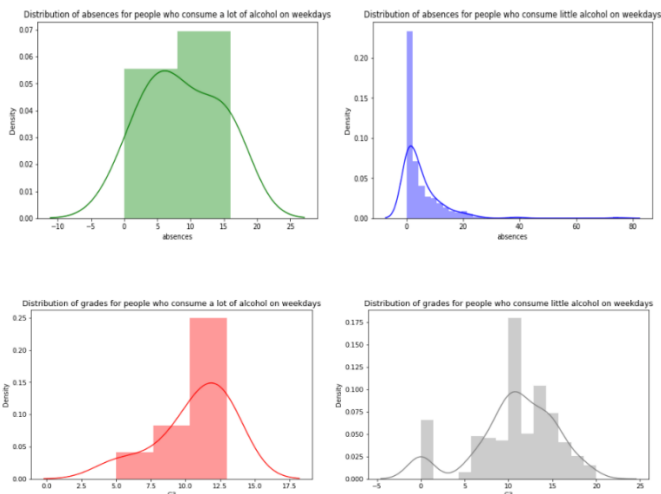

Drinking alcohol on weekdays is a bad idea. Of course, the number of those who love to drink on weekdays is much less than the number of those who prefer to spend weekdays sober. But we can see that the final grades of these students are significantly lower. Let's look at the situation with the consumption of alcohol on the weekend.

Weekend alcohol consumption (numeric: from 1 - very low to 5 - very high)
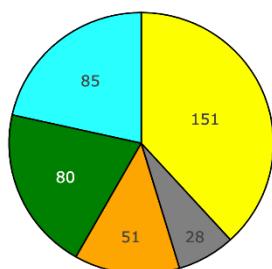
Of course the situation has changed. On weekends, more students like to relax and drink. We wonder what the situation will be with the final grades.
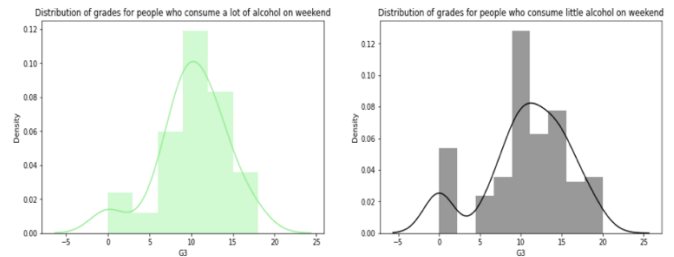
Seems consuming alcohol on weekend will not affect the grades at school (but better not abuse). On this happy note, we propose to consider one more important thing - additional paid courses that the student attends. It is good when a student wants to study extra, and parents have the opportunity to pay for courses. This can tell us not only about the commitment of the student, but also about the social status of the family. Personally, we did not understand as a child how important it is to engage not only in school, but also on their own. Let's see.
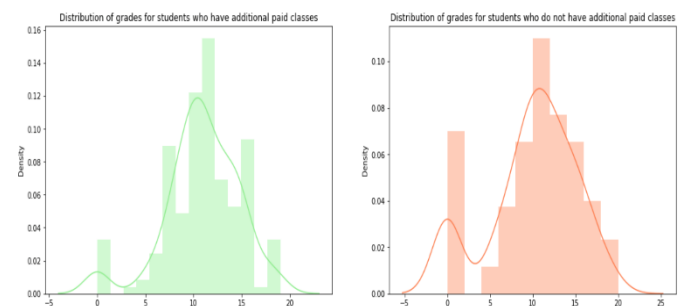

We also have information about the student's desire to get higher education in the future. This is useful information! Does the desire to get higher education influence the final grades?
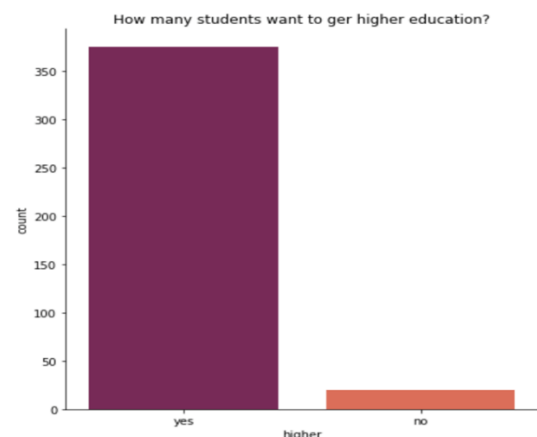
The above plot shows how many students want to go for higher education. Data shows almost all students want to get higher education.

Box plot for final grades.depending on the desire to have higher education
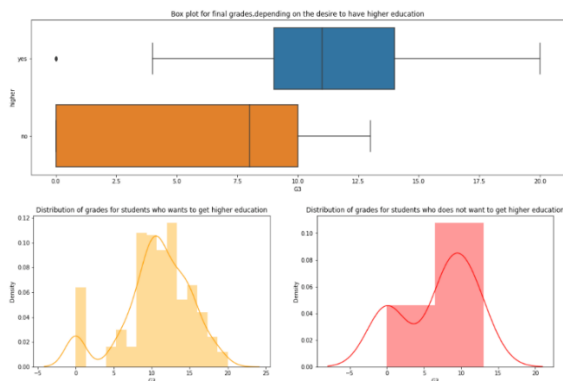
The desire to get higher education stimulates students to get higher grades. And ofcourse I did not forget to pay attention to the presence of the Internet at the student's home. Nowadays, the Internet is very important. Quick access to information or the ability to find a solution to the problem without a long search in the textbooks.

How many students have not Internet (yes, i am shocked too)?
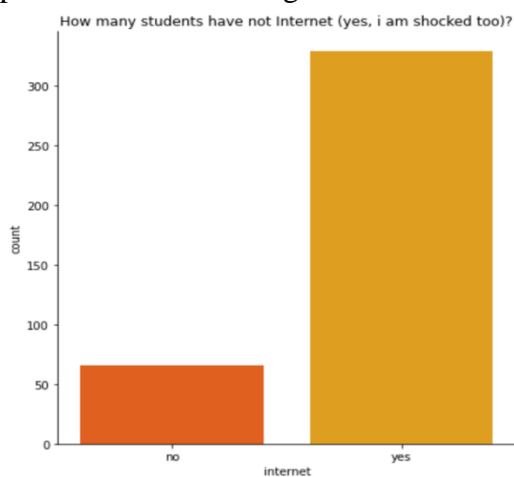
The above figure shows ow many students with and without internet access. First, let's see whether the availability of the Internet affects the number of hours students spend on their studies.

How many hours do students without access to the Internet spend on studies?
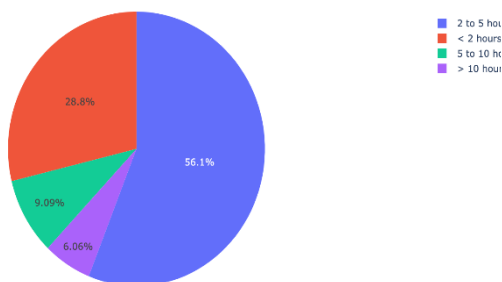
How many hours do students with access to the Internet spend on studies?

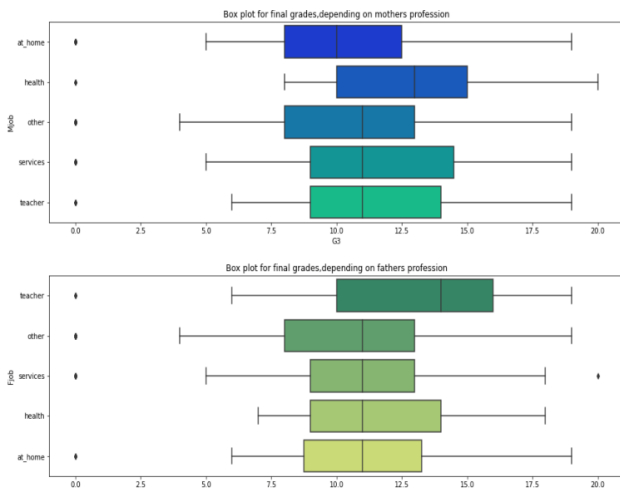Box plot for final grades.depending on the access to the Internet
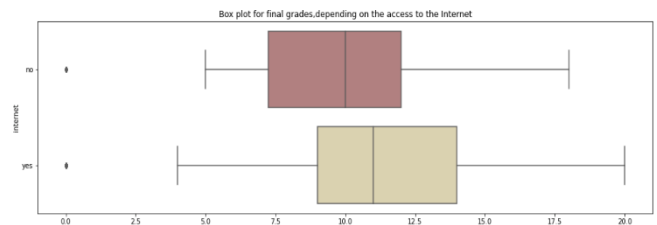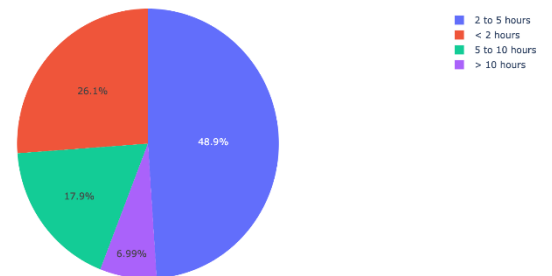
From the given data and analysis, students spend less time on studies with internet access.

the last thing we'll look at is the student's family. The family plays a very important role in the development of the child. The data set gives us a lot of information about the student's family, profession and education of parents and so on. We can't just walk away! Let's start with the fact that we look at the number of people in the families of the student and the status of residence of parents: father and mother live together or not.

Number of people in the family: GT3 - more than 3, LE3 - less than 3
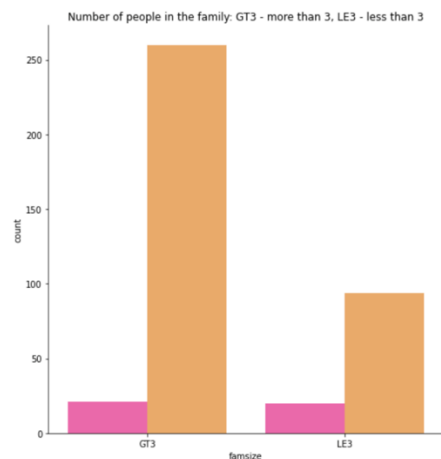
Most students live with their mother and father. We have a lot of information about parents of students. Let's see what the student's mothers do. How many of them are doctors, housewives, and so on.

Box plot for final grades,depending on mothers profession

Box plot for final grades,depending on fathers profession

100% of the time to the beloved and so on and of course not to abuse alcohol on weekdays. What about the weekend? Science gives us the right to relax on weekends! Having good family relations and maintaining good health and spending less time on internet helps increasing grades in final.

This Project is very important to all the students and the institutions to find a path for their academic success and good future. Also, it helps in creating a new environment for the students to prepare for their future.

References
1) https://www.citationmachine.net/resources/is-there-a-secret-behind-academic-success/
2) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3843305/
3) https://thehavenatcollege.com/effects-of-alcohol-on-college-students/
4) https://medium.com/@anluong100/how-do-relationships-affect-a-students-academic-performance-359b7fac12f3
5) https://www.cdc.gov/healthyschools/health_and_academics/index.htm
6) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4058503/

Last but not least, the quality of family relationships. Quality of family relationships (from 1 - very bad to 5 – excellent)

Quality of family relationships(numeric: from 1 - very bad to 5 - excellent)
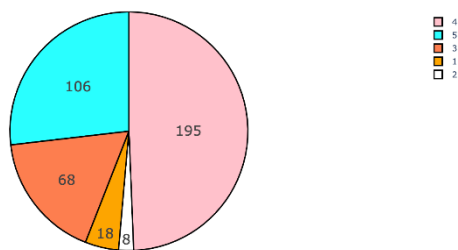
It is good to see that the quality of family relationships in most of the student's families is good or excellent.

Conclusion

Is there a secret of excellent grades? Certainly and as we have seen it is to give enough time to study, not to miss classes, remember that you can not give