UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF ENGINEERING

SCHOOL OF COMPUTING

SEMESTER 2/20212022

SECI2143-06 KEBARANGKALIAN STATISTIK & ANALISIS DATA
(PROBABILITY & STATISTICAL DATA ANALYSIS)

SECTION 06

PROJECT 2 - GROUP REPORT

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1.0 Introduction / Background

Sport is an activity that requires both physical effort and skill. This game pits two or more teams against each other. Sports are an important part of human life and have a huge effect on many parts of life.This main topic of this report is Favorite sports among first year students and its benefits to life. In which, the purpose of this survey is to investigate the relationship between first year students' sports background and its relations to life. In addition to that, this survey also shows more about students' interest in sports and how it relates to studies and mental health.

The survey included a total of 60 respondents. To fulfill the survey's requirements, a series of questions was provided to the students. This issue piqued our interest because many students struggle to balance their time and priorities between sports activity and academic tasks and projects. As a result of that thought,what we expected to see from the data is to analyse where we stood in comparison to other students in our year who are in similar situations. We anticipate that performing this survey will reveal that first-year students feel more energised and concentrated after participating in sports, which will aid them in their academics.We collected feedback from the student population at our university, specifically first year students.

2.0 Datasets

1-sample Hypothesis Test

The hypothesis testing 1-sample for the test 1 uses the variable, body mass index (BMI) in kg/m^2 . The population values were derived from the survey conducted by Open Access Journal in the year 2020. The sample values are derived from the survey collected by our group entitled as Favorite sports among first year students and its benefits to life. A total of 60 students took part in the survey. The purpose of this test is to check whether the mean BMI of first year university students in our dataset is equal to or higher than the survey collected by Open Access Journal. The possible outcome would be as if there will be insufficient evidence to show that the BMI of university students in our dataset is equal to or higher than the survey collected by Open Access Journal.

Correlation Test

The correlation test for test 2 uses the variable body mass index (BMI) in kg/m² and stress level because we want to see whether is there a connection between the two variables.And also we want measure the strength between body mass index and stress level.From the value of Correlation coefficient, r, we can determine the strength between the 2 variables whether it is strong,moderate or weak.It also can determine whether it has positive or negative linear relationship between the 2 variables.

Regression Test

For the regression analysis, we use 2 variables to be measured, which sleeping rates represents the independent variable for x-axis. On the other hand, the dependent is represented by variable stress level on the y-axis. Both chosen variables are used to analyze the hypothesis statement about the effects of sleeping rate towards stress level. The data from both also used to obtain the linear regression model, which consists of intersection and slope coefficients. Those value will be used to determine the test statistic where produce the outcome and decision of our hypothesis

The Chi-square Test of Independence

The Chi-square test of independence for test 4 uses the variable does sports affect your study life and gender because we want to see whether there is a relationship of dependency between the two variables.Where the possible outcome of the test is that the relationship between the variables are independent of each other. We are able to get the data from our Google form where we conducted a survey to collect the data and then convert the data there into an excel spreadsheet to then choose the appropriate data for respective tests to use for our r programming.

3.0 Data Analysis

3.1 Hypothesis Testing 1-sample

From the report conducted by Open Access Journal in the year 2020, we can know that the average body mass index (BMI) kg/m² of first year university students is 24.2 (Marcus, Choi, Pohl, Eyck, & Jackson, 2020). By using hypothesis testing 1 sample, we can check whether the mean BMI of first year university students in our dataset is equal to or higher than 24.2 kg/m². Assume the confidence level to be 95% and significant of $\alpha = 0.05$.

Population mean, $\bar{x}$, BMI (kg/m²) of first year university students = 24.2

Hypothesis Statement :

The null hypothesis, H0 = $\mu =$ 24.2
The alternative hypothesis, H1 = $\mu > 24.2$

$\alpha = 0.05$

Sample mean was obtained from the data of Favorite Sports among First Year Students and its benefit to life.

From R software,

Sample size, n = 60
Sample mean, $\bar{x}$ = 21.50833

$$\overline{x} = \frac{\Sigma x}{n}$$

Sample standard deviation, s = 3.918677

$$s = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N-1}}$$

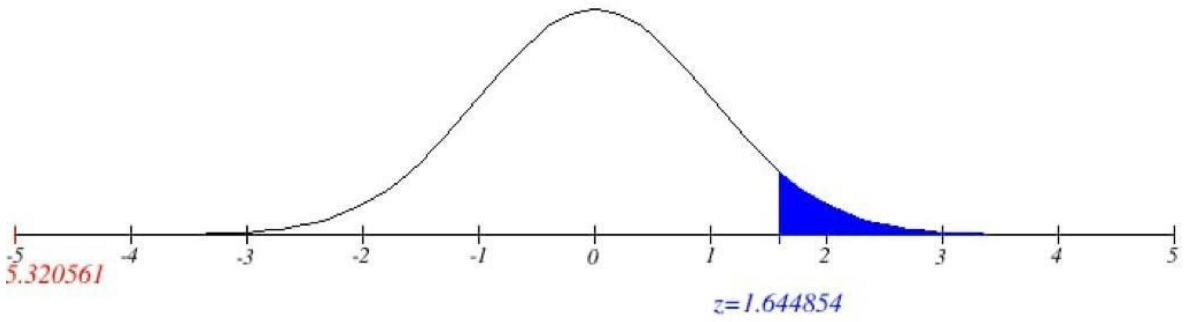
Test statistics :

$$Z = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

z = -5.320561

Critical value :

Critical value, cv = 1.644854



Decision :
Since the test statistics value < critical value, (-5.320561 < 1.644854), it fails to reject the null hypothesis.

Conclusion :
There is insufficient evidence to show that the mean BMI of first year university students in our dataset is equal to or higher than 24.2 kg.

3.2 Correlation Test

Test 2 : Correlation Analysis to investigate the relationship between body mass index (BMI) in kg/m² and stress level

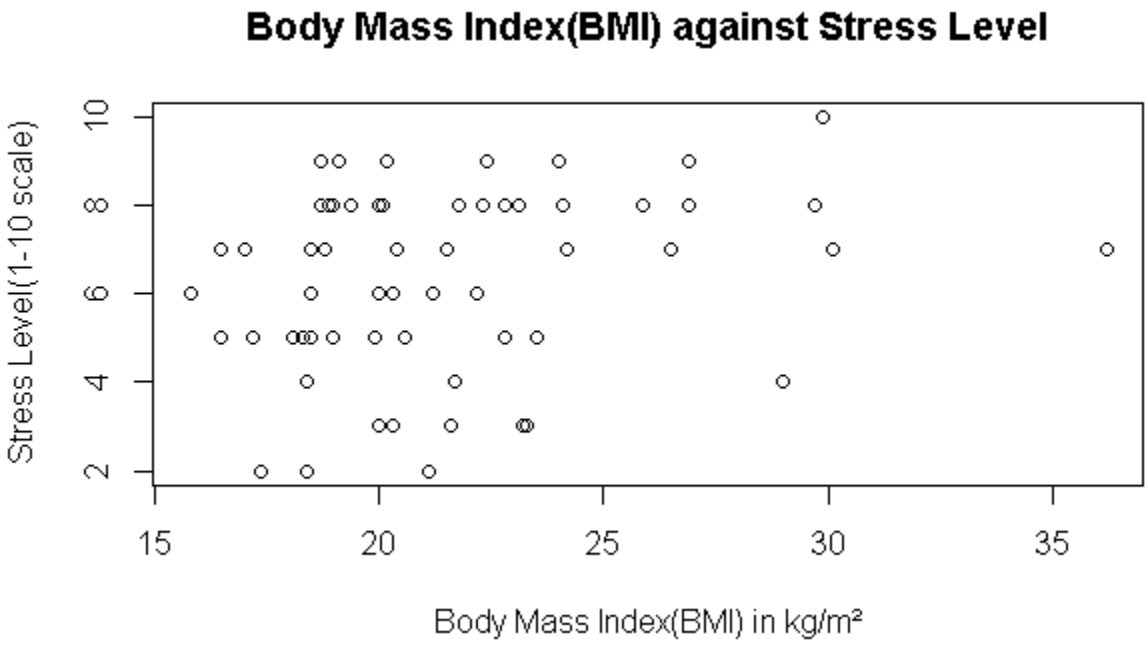
This test is to measure the strength of the relationship between body mass index (BMI) in kg/m² and stress level.

Assume the confidence level to be 95%, significant level , $\alpha = 0.05$.

Hypothesis statement:

H0: $\rho = 0$ (no linear correlation between body mass index (BMI) in kg/m² and stress level.)

H1: $\rho \neq 0$ (linear correlation exists between body mass index (BMI) in kg/m² and stress level.)



The independent variable is the body mass index (BMI) in kg/m² while the dependent variable is the stress level. Since both the variables are ratio scale data , hence we can use Person's product-moment correlation using cor.test() function in R to obtain the correlation coefficient (r).

$\alpha = 0.05$

Using R software,

Correlation coefficient, r = 0.2415853

From the value of r, we can tell that it has a weak positive linear relationship between body mass index (BMI) in kg/m² and stress level.

Test statistic:

Sample size = 60

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$

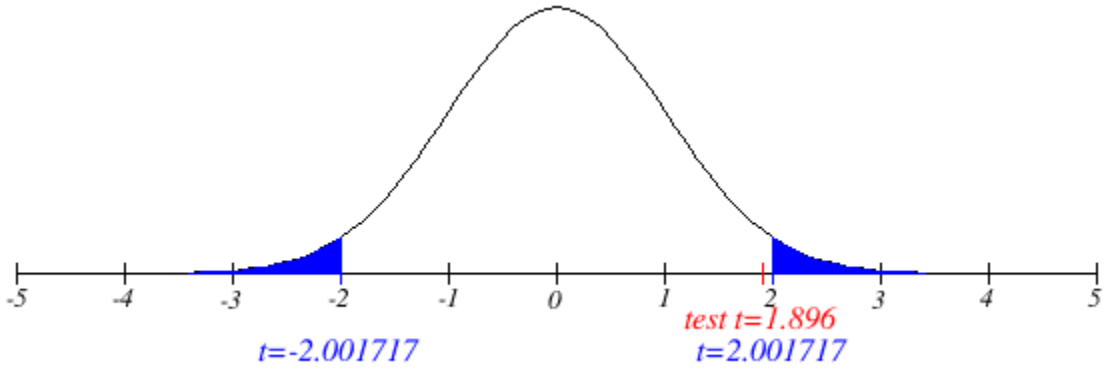
Test statistic = 1.896

Critical value:

Degree of freedom, df = 58

Critical value, -t0.025,58 = -2.001717

, t0.025,58 = 2.001717



Decision :

Since the test statistic , t = 1.896 is smaller than $t_{0.025,58}$ = 2.001717. It falls within the fail to reject region. Hence, we fail to reject the null hypothesis.

Conclusion:

There is sufficient evidence of **no linear correlation** between body mass index (BMI) in kg/m^2 and stress level at the 5% level of significance.

3.3 Regression Test

Test 3 : Regression analysis to investigate the relationship between stress level between sleeping rate

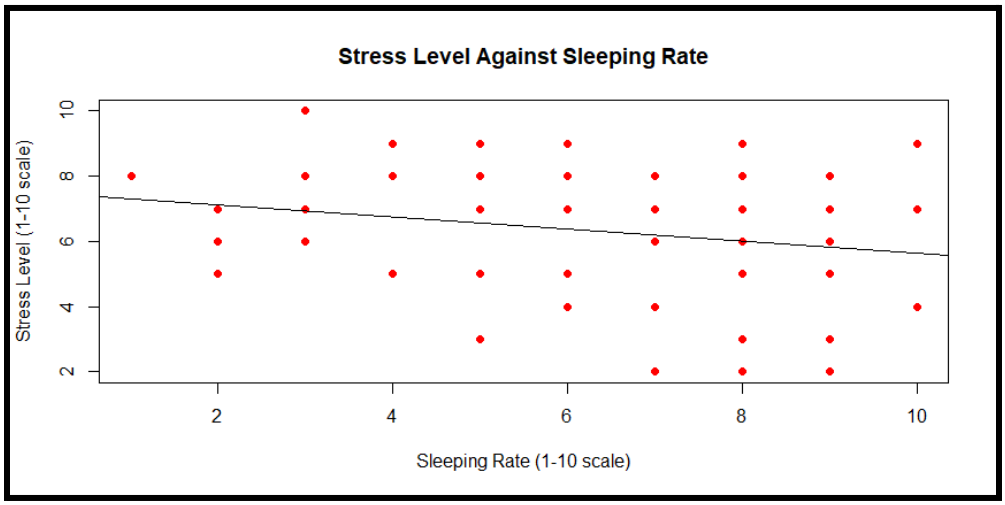
Assume the confidence level to be 95%, significant level , $\alpha = 0.05$.

Hypothesis statement,

H_0 : $\beta 1 = 0$ (no linear regression between stress level between sleeping rate)

H_0 : $\beta 1 \neq 0$ (there exist linear regression between stress level between sleeping rate)

Scatter plot,



Based on the graphical presentation above, we can conclude that stress level is the dependent variable which is affected by the sleeping rate that acts as an independent variable. Also, it has negative correlation between the variables.

Output summary of linear model in RStudio,

```
Call:
lm(formula = y ~ x)

Residuals:
    Min      1Q  Median      3Q     Max
-4.2053 -1.4373  0.2947  1.7947  3.3514

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   7.5043     0.7814   9.603 1.36e-13 ***
x            -0.1856     0.1150  -1.613    0.112
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.027 on 58 degrees of freedom
Multiple R-squared:  0.04293,   Adjusted R-squared:  0.02643
F-statistic: 2.602 on 1 and 58 DF,  p-value: 0.1122
```

Using lm() and summary() function in RStudio, we get

Linear regression model, y = 7.5043 - 0.1856x
= where b_0 (Intersection Coefficient) = 7.5043 and b_1 (Slope Coefficient) = - 0.1856

Coefficient of Determination, $R^2 = 0.04293$
= where it shows the this data has weaker relationship between stress level and sleeping rates

Standard error of estimate, $s_e = 2.027$
Standard Deviation of the Regression Slope, $s_{b1} = 0.1150$

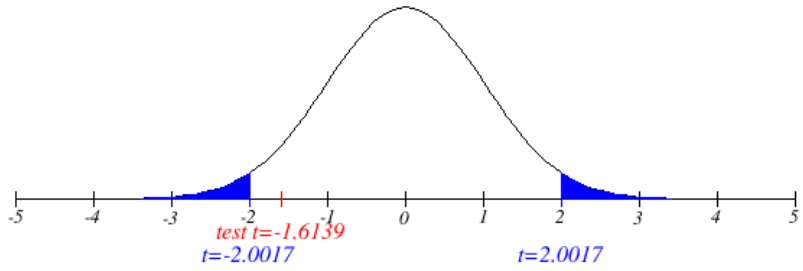
Test statistic,

$$t = \frac{b_1 - \beta_1}{s_{b_1}}$$

t = [(-0.1856) - 0] / 0.1150 = -1.6139

Critical value,

$\alpha = 0.05 / 2 = 0.025$, degree of freedom, df = 58
using t table, $t_{0.025,\ 58} = 2.0017$
$- t_{0.025,\ 58} = - 2.0017$



Decision,

Since the test statistic, -1.6139 is bigger than the critical value, -2.0017, and it falls outside the critical region, thus we fail to reject the H_0

Conclusion,

There's no sufficient evidence that sleeping rate affects the stress level

3.4 Chi Square Test

Test 4 : Chi-Square Test of Independence to determine whether there is a significant relationship between does sports affect your study life and gender.

Hypothesis Statement :

H0: Sports affecting your study life is independent of gender

H1: Sports affecting your study life is not independent of gender

Contingency table from RStudio:

Gender	No	Yes
Female	13	15
Male	11	21

Data : tbl

X-squared = 0.47154 , df = 1, p-value = 0.4923

Test statistic :

$\chi 2=0.47154$

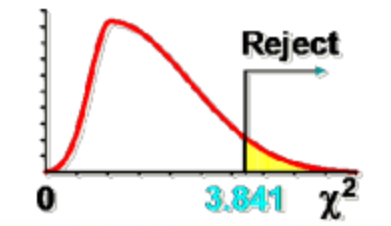
The degree of freedom is 1

$\boldsymbol{\alpha} = 0.05$

Critical value :

Critical value, cv = 3.841

The p-value is 0.4923



Decision:

Since, test statistic value(0.47154) < critical value and p-value(0.4923) > **α** value, thus fail to reject the null hypothesis.

Conclusion:

There is evidence that gender and does sports affect your study life are independent.

4.0 Conclusion

What have you learned from all activities done in Project 2?

We have learned how to delegate tasks accordingly among our group mates to ensure our project completion is efficient. Besides that, we can learn how to analyze inferential statistics from the data we collected in our google form survey called Favorite sports among first-year students and its life benefits. The many things that we have learned are hypothesis testing for 1-sample, correlation analysis, regression analysis and chi-square of independence. Moreover, We were able to learn how to use R programming to do many things such as making a contingency table, calculating X-square value, p-value, degree of freedom and many more. This project has helped us gain real-world knowledge that hopefully, we can implement in our working space in the future.

What are your best/interesting findings from your results?

From the first test, hypothesis testing of 1-sample, we used two values from two surveys in which the first survey is taken as population value, the survey conducted by Open Access Journal about average body mass index of freshman university students in the year 2020. Meanwhile, for the second survey, which was conducted by our group entitled as Favorite sports among first year students and its benefits to life which will be used as the sample values. The purpose of this test is to check whether the mean BMI of first year university students in our dataset is equal to or higher than the survey collected by Open Access Journal. In the end, from these two findings, we

were able to make connections between those BMI of first year students, in which the result is, there is insufficient evidence to show that the mean BMI of first year university students in our dataset is equal to or higher than 24.2 kg (population mean).

Correlation analysis, we found out that there is no linear correlation relationship between body mass index (BMI) in kg/m² and stress level.Hence we also fail to reject the null hypothesis. The relationship indicates a relatively weak positive correlation, where sample correlation coefficient,r = 0.2415853. In the real world, body mass index is not the only factor affecting stress level, but other factors also affect stress level,where studying for a long period will result in higher stress level.

Next , by referring to the result gained from **test 3, which was calculated using a regression test** given a surprising hypothesis conclusion. After comparing the test statistic and critical value, we found out that there's no sufficient evidence to claim that the stress level is affected by the sleeping rate. Also, this was proven by the test value not falling in the critical region. Generally, the excellent and sufficient quality of sleep influences both our physical and mental health.

Moving on, **from test 4, Chi-Square Test of Independence**, two values from the survey conducted which are gender and does sports affect your study life are the variables used. From these findings, we are expected to make connections on the dependency between the two variables, where the test's conceivable conclusion is that the variables' relationships are independent of one another. As a result of these findings, we have obtained and concluded that there is evidence that gender and does sports affect your study life are independent.

5.0 Appendix

E-portfolio links

Mohamed Ziyaafser Bin Mohd. Zinnah -
https://eportfolio.utm.my/user/mohamed-ziyaafser-bin-mohd-zin/project-2-psda

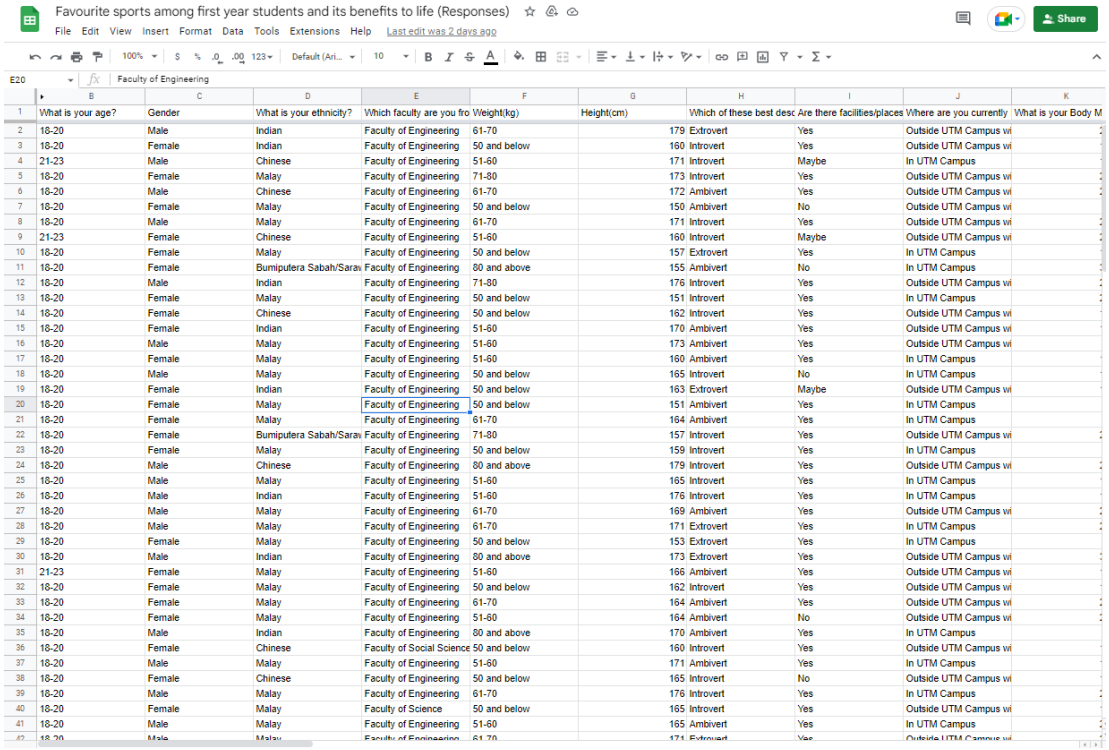
Kagineswaran A/L Tamil Vanan
https://eportfolio.utm.my/user/kagineswaran-a-l-tamil-vanan/psda-project-2

Haziq Farhan Bin Marajuddin
https://eportfolio.utm.my/user/haziq-farhan-bin-marajuddin/seci2143-06-probability-statistical-data-analysis

Vinodh A/L Nadarajah
https://eportfolio.utm.my/user/vinodh-a-l-nadarajah/psda-project-2

Spreadsheet of dataset link (Survey of Favorite sports among first-year students and its life benefits)
https://docs.google.com/spreadsheets/d/1phi-BAb9kEpbQRovG03a2qYcSPs0HGyUZM9PBuiLNX4/edit?usp=sharing

Spreadsheet of dataset (Survey of Favorite sports among first-year students and its life benefits)



Favourite sports among first year students and its benefits to life (Responses)

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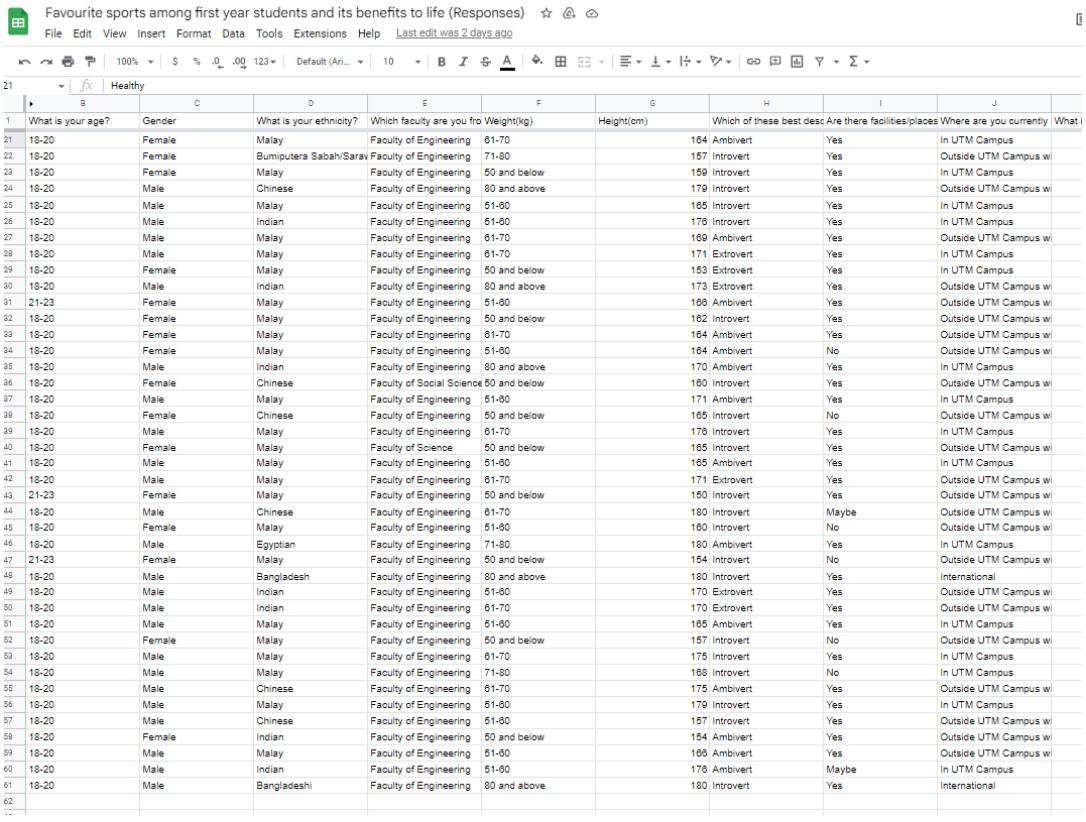
E20 | Faculty of Engineering

	B	C	D	E	F	G	H	I	J	K
1	What is your age?	Gender	What is your ethnicity?	Which faculty are you fro	Weight(kg)	Height(cm)	Which of these best desc	Are there facilities/places	Where are you currently	What is your Body M
2	18-20	Male	Indian	Faculty of Engineering	61-70	179	Extrovert	Yes	Outside UTM Campus wi	
3	18-20	Female	Indian	Faculty of Engineering	50 and below	160	Introvert	Yes	Outside UTM Campus wi	
4	21-23	Male	Chinese	Faculty of Engineering	51-60	171	Introvert	Maybe	In UTM Campus	
5	18-20	Female	Malay	Faculty of Engineering	71-80	173	Introvert	Yes	Outside UTM Campus wi	
6	18-20	Male	Chinese	Faculty of Engineering	61-70	172	Ambivert	Yes	Outside UTM Campus wi	
7	18-20	Female	Malay	Faculty of Engineering	50 and below	150	Ambivert	No	Outside UTM Campus wi	
8	18-20	Male	Malay	Faculty of Engineering	61-70	171	Introvert	Yes	Outside UTM Campus wi	
9	21-23	Female	Chinese	Faculty of Engineering	51-60	160	Introvert	Maybe	Outside UTM Campus wi	
10	18-20	Female	Malay	Faculty of Engineering	50 and below	157	Extrovert	Yes	In UTM Campus	
11	18-20	Female	Bumiputera Sabah/Sarav	Faculty of Engineering	80 and above	155	Ambivert	No	In UTM Campus	
12	18-20	Male	Indian	Faculty of Engineering	71-80	176	Introvert	Yes	Outside UTM Campus wi	
13	18-20	Female	Malay	Faculty of Engineering	50 and below	151	Introvert	Yes	In UTM Campus	
14	18-20	Female	Chinese	Faculty of Engineering	50 and below	162	Introvert	Yes	Outside UTM Campus wi	
15	18-20	Female	Indian	Faculty of Engineering	51-60	170	Ambivert	Yes	Outside UTM Campus wi	
16	18-20	Male	Malay	Faculty of Engineering	51-60	173	Ambivert	Yes	Outside UTM Campus wi	
17	18-20	Female	Malay	Faculty of Engineering	51-60	160	Ambivert	Yes	In UTM Campus	
18	18-20	Male	Malay	Faculty of Engineering	50 and below	165	Introvert	No	In UTM Campus	
19	18-20	Female	Indian	Faculty of Engineering	50 and below	163	Extrovert	Maybe	Outside UTM Campus wi	
20	18-20	Female	Malay	Faculty of Engineering	50 and below	151	Ambivert	Yes	In UTM Campus	
21	18-20	Female	Malay	Faculty of Engineering	61-70	164	Ambivert	Yes	In UTM Campus	
22	18-20	Female	Bumiputera Sabah/Sarav	Faculty of Engineering	71-80	157	Introvert	Yes	Outside UTM Campus wi	
23	18-20	Female	Malay	Faculty of Engineering	50 and below	159	Introvert	Yes	In UTM Campus	
24	18-20	Male	Chinese	Faculty of Engineering	80 and above	179	Introvert	Yes	Outside UTM Campus wi	
25	18-20	Male	Malay	Faculty of Engineering	51-60	165	Introvert	Yes	In UTM Campus	
26	18-20	Male	Indian	Faculty of Engineering	51-60	176	Introvert	Yes	In UTM Campus	
27	18-20	Male	Malay	Faculty of Engineering	61-70	169	Ambivert	Yes	Outside UTM Campus wi	
28	18-20	Male	Malay	Faculty of Engineering	61-70	171	Extrovert	Yes	In UTM Campus	
29	18-20	Female	Malay	Faculty of Engineering	50 and below	153	Extrovert	Yes	In UTM Campus	
30	18-20	Male	Indian	Faculty of Engineering	80 and above	173	Extrovert	Yes	Outside UTM Campus wi	
31	21-23	Female	Malay	Faculty of Engineering	51-60	166	Ambivert	Yes	Outside UTM Campus wi	
32	18-20	Female	Malay	Faculty of Engineering	50 and below	162	Introvert	Yes	Outside UTM Campus wi	
33	18-20	Female	Malay	Faculty of Engineering	61-70	164	Ambivert	Yes	Outside UTM Campus wi	
34	18-20	Female	Malay	Faculty of Engineering	51-60	164	Ambivert	No	Outside UTM Campus wi	
35	18-20	Male	Indian	Faculty of Engineering	80 and above	170	Ambivert	Yes	In UTM Campus	
36	18-20	Female	Chinese	Faculty of Social Science	50 and below	160	Introvert	Yes	Outside UTM Campus wi	
37	18-20	Male	Malay	Faculty of Engineering	51-60	171	Ambivert	Yes	In UTM Campus	
38	18-20	Female	Chinese	Faculty of Engineering	50 and below	165	Introvert	No	Outside UTM Campus wi	
39	18-20	Male	Malay	Faculty of Engineering	61-70	176	Introvert	Yes	In UTM Campus	
40	18-20	Female	Malay	Faculty of Science	50 and below	165	Introvert	Yes	Outside UTM Campus wi	
41	18-20	Male	Malay	Faculty of Engineering	51-60	165	Ambivert	Yes	In UTM Campus	



Favourite sports among first year students and its benefits to life (Responses)

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21 | Healthy

	B	C	D	E	F	G	H	I	J
1	What is your age?	Gender	What is your ethnicity?	Which faculty are you fro	Weight(kg)	Height(cm)	Which of these best desc	Are there facilities/places	Where are you currently
21	18-20	Female	Malay	Faculty of Engineering	61-70	164	Ambivert	Yes	In UTM Campus
22	18-20	Female	Bumiputera Sabah/Sarav	Faculty of Engineering	71-80	157	Introvert	Yes	Outside UTM Campus wi
23	18-20	Female	Malay	Faculty of Engineering	50 and below	159	Introvert	Yes	In UTM Campus
24	18-20	Male	Chinese	Faculty of Engineering	80 and above	179	Introvert	Yes	Outside UTM Campus wi
25	18-20	Male	Malay	Faculty of Engineering	51-60	165	Introvert	Yes	In UTM Campus
26	18-20	Male	Indian	Faculty of Engineering	51-60	176	Introvert	Yes	In UTM Campus
27	18-20	Male	Malay	Faculty of Engineering	61-70	169	Ambivert	Yes	Outside UTM Campus wi
28	18-20	Male	Malay	Faculty of Engineering	61-70	171	Extrovert	Yes	In UTM Campus
29	18-20	Female	Malay	Faculty of Engineering	50 and below	153	Extrovert	Yes	In UTM Campus
30	18-20	Male	Indian	Faculty of Engineering	80 and above	173	Extrovert	Yes	Outside UTM Campus wi
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41	18-20	Male	Malay	Faculty of Engineering	51-60	165	Ambivert	Yes	In UTM Campus
42	18-20	Male	Malay	Faculty of Engineering	61-70	171	Extrovert	Yes	Outside UTM Campus wi
43	21-23	Female	Malay	Faculty of Engineering	50 and below	150	Introvert	Yes	Outside UTM Campus wi
44	18-20	Male	Chinese	Faculty of Engineering	61-70	180	Introvert	Maybe	Outside UTM Campus wi
45	18-20	Female	Malay	Faculty of Engineering	51-60	160	Introvert	No	Outside UTM Campus wi
46	18-20	Male	Egyptian	Faculty of Engineering	71-80	180	Ambivert	Yes	In UTM Campus
47	21-23	Female	Malay	Faculty of Engineering	50 and below	154	Introvert	No	Outside UTM Campus wi
48	18-20	Male	Bangladesh	Faculty of Engineering	80 and above	180	Introvert	Yes	International
49	18-20	Male	Indian	Faculty of Engineering	51-60	170	Extrovert	Yes	Outside UTM Campus wi
50	18-20	Male	Indian	Faculty of Engineering	61-70	170	Extrovert	Yes	Outside UTM Campus wi
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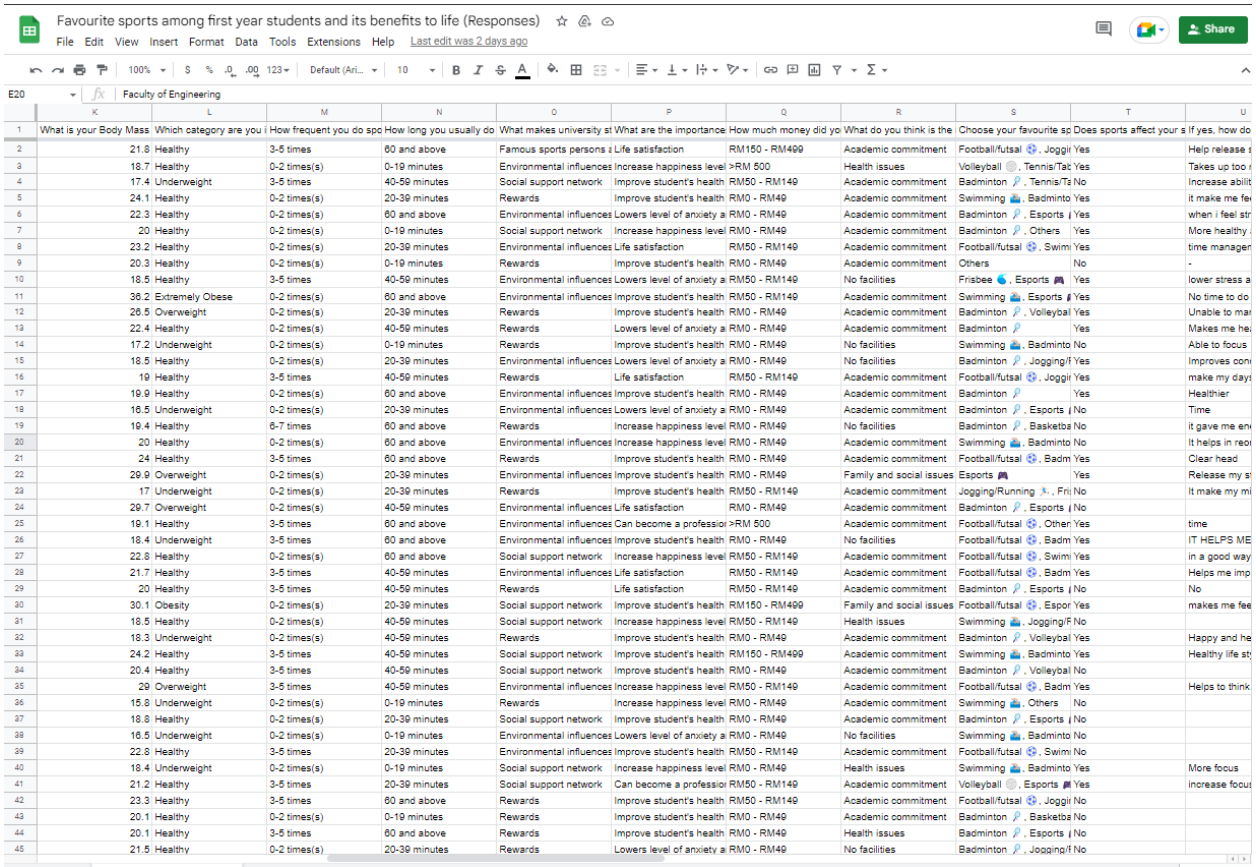
61	18-20	Male	Bangladeshi	Faculty of Engineering	80 and above	180	Introvert	Yes	International



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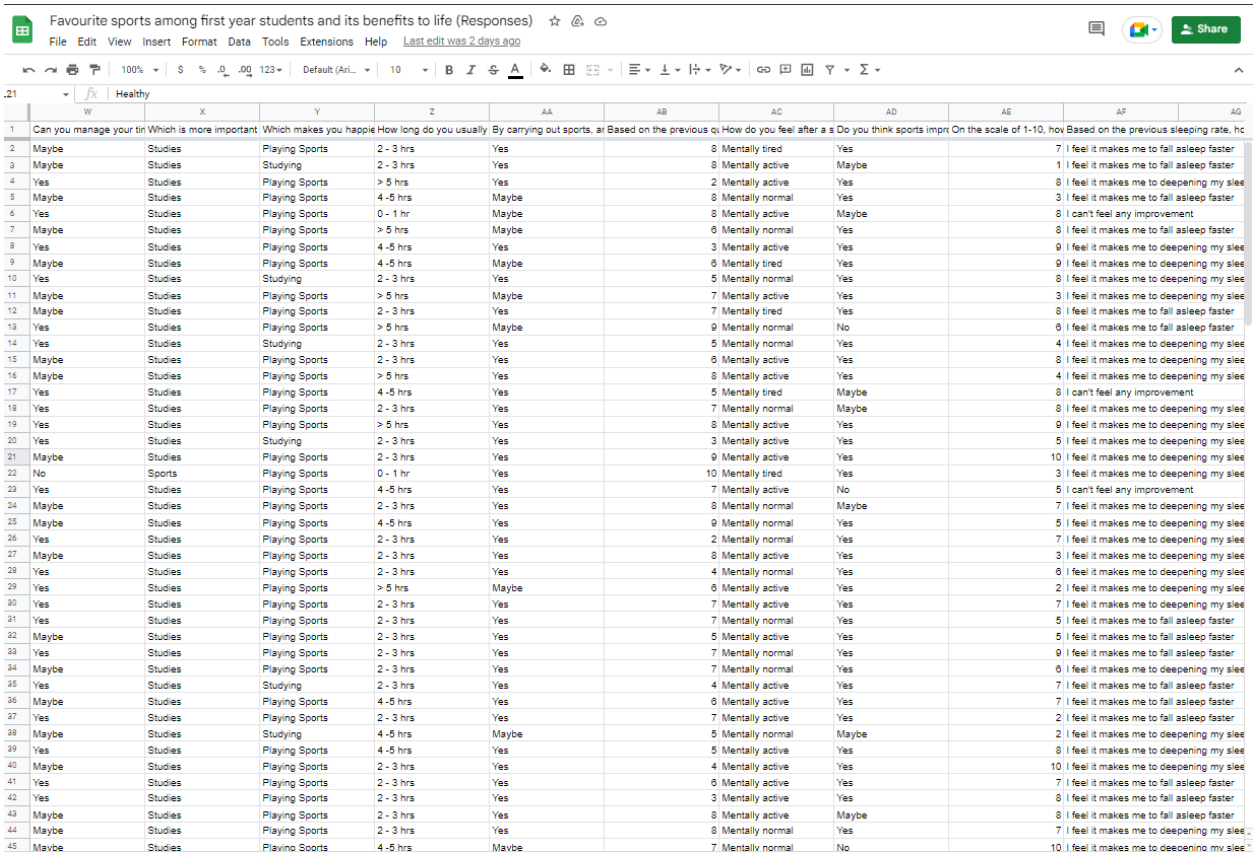
E20 Faculty of Engineering

	K	L	M	N	O	P	Q	R	S	T	U
1	What is your Body Mass	Which category are you i	How frequent you do spo	How long you usually do	What makes university st	What are the importance	How much money did yo	What do you think is the	Choose your favourite sp	Does sports affect your s	If yes, how do
2	21.8	Healthy	3-5 times	60 and above	Famous sports persons a	Life satisfaction	RM150 - RM499	Academic commitment	Football/futsal , Joggi	Yes	Help release s
3	18.7	Healthy	0-2 times(s)	0-19 minutes	Environmental influences	Increase happiness level	>RM 500	Health issues	Volleyball , Tennis/Tat	Yes	Takes up too
4	17.4	Underweight	3-5 times	40-59 minutes	Social support network	Improve student's health	RM50 - RM149	Academic commitment	Badminton , Tennis/Te	No	Increase abilit
5	24.1	Healthy	0-2 times(s)	20-39 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Swimming , Badminto	Yes	it make me fe
6	22.3	Healthy	0-2 times(s)	60 and above	Environmental influences	Lowers level of anxiety a	RM0 - RM49	Academic commitment	Badminton , Esports	Yes	when i feel str
7	20	Healthy	0-2 times(s)	0-19 minutes	Social support network	Increase happiness level	RM0 - RM49	Academic commitment	Badminton , Others	Yes	More healthy
8	23.2	Healthy	0-2 times(s)	20-39 minutes	Environmental influences	Life satisfaction	RM50 - RM149	Academic commitment	Football/futsal , Swim	Yes	time manager
9	20.3	Healthy	0-2 times(s)	0-19 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Others	No	-
10	18.5	Healthy	3-5 times	40-59 minutes	Environmental influences	Lowers level of anxiety a	RM50 - RM149	No facilities	Frisbee , Esports	Yes	lower stress a
11	36.2	Extremely Obese	0-2 times(s)	60 and above	Environmental influences	Improve student's health	RM50 - RM149	Academic commitment	Swimming , Esports	Yes	No time to do
12	26.5	Overweight	0-2 times(s)	20-39 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Volleybal	Yes	Unable to ma
13	22.4	Healthy	0-2 times(s)	40-59 minutes	Rewards	Lowers level of anxiety a	RM0 - RM49	Academic commitment	Badminton	Yes	Makes me he
14	17.2	Underweight	0-2 times(s)	0-19 minutes	Rewards	Improve student's health	RM0 - RM49	No facilities	Swimming , Badminto	No	Able to focus
15	18.5	Healthy	0-2 times(s)	20-39 minutes	Environmental influences	Lowers level of anxiety a	RM0 - RM49	No facilities	Badminton , Jogging/F	Yes	Improves con
16	19	Healthy	3-5 times	40-59 minutes	Rewards	Life satisfaction	RM50 - RM149	Academic commitment	Football/futsal , Joggi	Yes	make my days
17	19.9	Healthy	0-2 times(s)	60 and above	Environmental influences	Improve student's health	RM0 - RM49	Academic commitment	Badminton	Yes	Healthier
18	16.5	Underweight	0-2 times(s)	20-39 minutes	Environmental influences	Lowers level of anxiety a	RM0 - RM49	Academic commitment	Badminton , Esports	No	Time
19	19.4	Healthy	6-7 times	60 and above	Rewards	Increase happiness level	RM0 - RM49	No facilities	Badminton , Basketba	No	it gave me en
20	20	Healthy	0-2 times(s)	60 and above	Environmental influences	Increase happiness level	RM0 - RM49	Academic commitment	Swimming , Badminto	No	It helps in reo
21	24	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Football/futsal , Badm	Yes	Clear head
22	29.9	Overweight	0-2 times(s)	20-39 minutes	Environmental influences	Improve student's health	RM0 - RM49	Family and social issues	Esports	Yes	Release my s
23	17	Underweight	0-2 times(s)	20-39 minutes	Rewards	Improve student's health	RM50 - RM149	Academic commitment	Jogging/Running , Fri	No	It make my mi
24	29.7	Overweight	0-2 times(s)	40-59 minutes	Environmental influences	Life satisfaction	RM0 - RM49	Academic commitment	Badminton , Esports	No	
25	19.1	Healthy	3-5 times	60 and above	Environmental influences	Can become a professio	>RM 500	Academic commitment	Football/futsal , Other	Yes	time
26	18.4	Underweight	3-5 times	60 and above	Environmental influences	Improve student's health	RM0 - RM49	No facilities	Football/futsal , Badm	Yes	IT HELPS ME
27	22.8	Healthy	0-2 times(s)	60 and above	Social support network	Increase happiness level	RM50 - RM149	Academic commitment	Football/futsal , Swim	Yes	in a good way
28	21.7	Healthy	3-5 times	40-59 minutes	Environmental influences	Life satisfaction	RM50 - RM149	Academic commitment	Football/futsal , Badm	Yes	Helps me imp
29	20	Healthy	3-5 times	40-59 minutes	Rewards	Life satisfaction	RM50 - RM149	Academic commitment	Badminton , Esports	No	No
30	30.1	Obesity	0-2 times(s)	20-39 minutes	Social support network	Improve student's health	RM150 - RM499	Family and social issues	Football/futsal , Espor	Yes	makes me fee
31	18.5	Healthy	0-2 times(s)	40-59 minutes	Social support network	Increase happiness level	RM50 - RM149	Health issues	Swimming , Jogging/F	No	
32	18.3	Underweight	0-2 times(s)	40-59 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Volleybal	Yes	Happy and he
33	24.2	Healthy	3-5 times	40-59 minutes	Social support network	Improve student's health	RM150 - RM499	Academic commitment	Swimming , Badminto	Yes	Healthy life st
34	20.4	Healthy	3-5 times	40-59 minutes	Social support network	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Volleybal	No	
35	29	Overweight	3-5 times	40-59 minutes	Environmental influences	Increase happiness level	RM50 - RM149	Academic commitment	Football/futsal , Badm	Yes	Helps to think
36	15.8	Underweight	0-2 times(s)	0-19 minutes	Rewards	Increase happiness level	RM0 - RM49	Academic commitment	Swimming , Others	No	
37	18.8	Healthy	0-2 times(s)	20-39 minutes	Social support network	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Esports	No	
38	16.5	Underweight	0-2 times(s)	0-19 minutes	Environmental influences	Lowers level of anxiety a	RM0 - RM49	No facilities	Swimming , Badminto	No	
39	22.8	Healthy	3-5 times	20-39 minutes	Environmental influences	Improve student's health	RM50 - RM149	Academic commitment	Football/futsal , Swim	No	
40	18.4	Underweight	0-2 times(s)	0-19 minutes	Social support network	Increase happiness level	RM0 - RM49	Health issues	Swimming , Badminto	Yes	More focus
41	21.2	Healthy	3-5 times	20-39 minutes	Social support network	Can become a professio	RM50 - RM149	Academic commitment	Volleyball , Esports	Yes	increase focu
42	23.3	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM50 - RM149	Academic commitment	Football/futsal , Joggi	No	
43	20.1	Healthy	0-2 times(s)	0-19 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Basketba	No	
44	20.1	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM0 - RM49	Health issues	Badminton , Esports	No	
45	21.5	Healthy	0-2 times(s)	20-39 minutes	Rewards	Lowers level of anxiety a	RM0 - RM49	No facilities	Badminton , Jogging/F	No	

19.4	Healthy	6-7 times	60 and above	Rewards	Increase happiness level	RM0 - RM49	No facilities	Badminton , Basketba	No	it gave me en
20	Healthy	0-2 times(s)	60 and above	Environmental influences	Increase happiness level	RM0 - RM49	Academic commitment	Swimming , Badminto	No	It helps in reo
24	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Football/futsal , Badm	Yes	Clear head
29.9	Overweight	0-2 times(s)	20-39 minutes	Environmental influences	Improve student's health	RM0 - RM49	Family and social issues	Esports	Yes	Release my s
17	Underweight	0-2 times(s)	20-39 minutes	Rewards	Improve student's health	RM50 - RM149	Academic commitment	Jogging/Running , Fri	No	It make my mi
29.7	Overweight	0-2 times(s)	40-59 minutes	Environmental influences	Life satisfaction	RM0 - RM49	Academic commitment	Badminton , Esports	No	
19.1	Healthy	3-5 times	60 and above	Environmental influences	Can become a professio	>RM 500	Academic commitment	Football/futsal , Other	Yes	time
18.4	Underweight	3-5 times	60 and above	Environmental influences	Improve student's health	RM0 - RM49	No facilities	Football/futsal , Badm	Yes	IT HELPS ME
22.8	Healthy	0-2 times(s)	60 and above	Social support network	Increase happiness level	RM50 - RM149	Academic commitment	Football/futsal , Swim	Yes	in a good way
21.7	Healthy	3-5 times	40-59 minutes	Environmental influences	Life satisfaction	RM50 - RM149	Academic commitment	Football/futsal , Badm	Yes	Helps me imp
20	Healthy	3-5 times	40-59 minutes	Rewards	Life satisfaction	RM50 - RM149	Academic commitment	Badminton , Esports	No	No
30.1	Obesity	0-2 times(s)	20-39 minutes	Social support network	Improve student's health	RM150 - RM499	Family and social issues	Football/futsal , Espor	Yes	makes me fee
18.5	Healthy	0-2 times(s)	40-59 minutes	Social support network	Increase happiness level	RM50 - RM149	Health issues	Swimming , Jogging/F	No	
18.3	Underweight	0-2 times(s)	40-59 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Volleybal	Yes	Happy and he
24.2	Healthy	3-5 times	40-59 minutes	Social support network	Improve student's health	RM150 - RM499	Academic commitment	Swimming , Badminto	Yes	Healthy life st
20.4	Healthy	3-5 times	40-59 minutes	Social support network	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Volleybal	No	
29	Overweight	3-5 times	40-59 minutes	Environmental influences	Increase happiness level	RM50 - RM149	Academic commitment	Football/futsal , Badm	Yes	Helps to think
15.8	Underweight	0-2 times(s)	0-19 minutes	Rewards	Increase happiness level	RM0 - RM49	Academic commitment	Swimming , Others	No	
18.8	Healthy	0-2 times(s)	20-39 minutes	Social support network	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Esports	No	
16.5	Underweight	0-2 times(s)	0-19 minutes	Environmental influences	Lowers level of anxiety a	RM0 - RM49	No facilities	Swimming , Badminto	No	
22.8	Healthy	3-5 times	20-39 minutes	Environmental influences	Improve student's health	RM50 - RM149	Academic commitment	Football/futsal , Swim	No	
18.4	Underweight	0-2 times(s)	0-19 minutes	Social support network	Increase happiness level	RM0 - RM49	Health issues	Swimming , Badminto	Yes	More focus
21.2	Healthy	3-5 times	20-39 minutes	Social support network	Can become a professio	RM50 - RM149	Academic commitment	Volleyball , Esports	Yes	increase focus
23.3	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM50 - RM149	Academic commitment	Football/futsal , Joggi	No	
20.1	Healthy	0-2 times(s)	0-19 minutes	Rewards	Improve student's health	RM0 - RM49	Academic commitment	Badminton , Basketba	No	
20.1	Healthy	3-5 times	60 and above	Rewards	Improve student's health	RM0 - RM49	Health issues	Badminton , Esports	No	
21.5	Healthy	0-2 times(s)	20-39 minutes	Rewards	Lowers level of anxiety a	RM0 - RM49	No facilities	Badminton , Jogging/F	No	
22.2	Healthy	0-2 times(s)	40-59 minutes	Rewards	Lowers level of anxiety a	RM50 - RM149	Academic commitment	Football/futsal , Swim	Yes	Makes me ha
18.1	Underweight	0-2 times(s)	20-39 minutes	Environmental influences	Improve student's health	RM0 - RM49	Health issues	Badminton , Jogging/F	Yes	Focus better
26.9	Overweight	0-2 times(s)	60 and above	Social support network	Lowers level of anxiety a	RM50 - RM149	Academic commitment	Football/futsal , Badm	Yes	Keeps my min
19	Healthy	0-2 times(s)	60 and above	Famous sports persons a	Lowers level of anxiety a	RM50 - RM149	Academic commitment	Swimming , Tennis/Ta	No	
23.1	Healthy	0-2 times(s)	40-59 minutes	Social support network	Lowers level of anxiety a	RM150 - RM499	Academic commitment	Football/futsal , Espor	Yes	RELEAVE ST
20.2	Healthy	0-2 times(s)	40-59 minutes	Environmental influences	Improve student's health	RM0 - RM49	No facilities	Volleyball , Tennis/Tat	Yes	Feel like must
18.7	Healthy	0-2 times(s)	20-39 minutes	Environmental influences	Increase happiness level	RM0 - RM49	Academic commitment	Badminton , Jogging/F	Yes	helps to stay f
20.6	Healthy	0-2 times(s)	40-59 minutes	Social support network	Improve student's health	RM50 - RM149	Academic commitment	Jogging/Running , Ha	Yes	strengthen my
25.9	Overweight	0-2 times(s)	20-39 minutes	Rewards	Improve student's health	RM50 - RM149	Academic commitment	Football/futsal , Badm	No	
20	Healthy	6-7 times	40-59 minutes	Rewards	Can become a professio	RM150 - RM499	Academic commitment	Badminton , Jogging/F	No	
21.6	Healthy	0-2 times(s)	60 and above	Social support network	Life satisfaction	RM0 - RM49	Family and social issues	Badminton , Esports	Yes	refreshing min
23.5	Healthy	0-2 times(s)	0-19 minutes	Social support network	Improve student's health	RM0 - RM49	Family and social issues	Football/futsal , Badm	Yes	Sport can mak
18.9	Healthy	0-2 times(s)	60 and above	Social support network	Improve student's health	RM0 - RM49	No facilities	Swimming , Badminto	No	
21.1	Healthy	3-5 times	20-39 minutes	Environmental influences	Improve student's health	RM0 - RM49	Health issues	Football/futsal , Badm	Yes	Improve my b
20.3	Healthy	3-5 times	40-59 minutes	Social support network	Lowers level of anxiety a	RM50 - RM149	No facilities	Football/futsal , Swim	No	
26.9	Overweight	0-2 times(s)	60 and above	Social support network	Lowers level of anxiety a	RM0 - RM49	Academic commitment	Football/futsal , Espor	Yes	It helps to kee



Favourite sports among first year students and its benefits to life (Responses)

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	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1	Can you manage your tir	Which is more important	Which makes you happie	How long do you usually	By carrying out sports, ar	Based on the previous q	How do you feel after a s	Do you think sports impr	On the scale of 1-10, hov	Based on the previous sleeping rate, hc	
2	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally tired	Yes	7	I feel it makes me to fall asleep faster	
3	Maybe	Studies	Studying	2 - 3 hrs	Yes	8	Mentally active	Maybe	1	I feel it makes me to fall asleep faster	
4	Yes	Studies	Playing Sports	> 5 hrs	Yes	2	Mentally active	Yes	8	I feel it makes me to deepening my slee	
5	Maybe	Studies	Playing Sports	4 -5 hrs	Maybe	8	Mentally normal	Yes	3	I feel it makes me to fall asleep faster	
6	Yes	Studies	Playing Sports	0 - 1 hr	Maybe	8	Mentally active	Maybe	8	I can't feel any improvement	
7	Maybe	Studies	Playing Sports	> 5 hrs	Maybe	6	Mentally normal	Yes	8	I feel it makes me to fall asleep faster	
8	Yes	Studies	Playing Sports	4 -5 hrs	Yes	3	Mentally active	Yes	9	I feel it makes me to deepening my slee	
9	Maybe	Studies	Playing Sports	4 -5 hrs	Maybe	6	Mentally tired	Yes	9	I feel it makes me to deepening my slee	
10	Yes	Studies	Studying	2 - 3 hrs	Yes	5	Mentally normal	Yes	8	I feel it makes me to deepening my slee	
11	Maybe	Studies	Playing Sports	> 5 hrs	Maybe	7	Mentally active	Yes	3	I feel it makes me to deepening my slee	
12	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally tired	Yes	8	I feel it makes me to fall asleep faster	
13	Yes	Studies	Playing Sports	> 5 hrs	Maybe	9	Mentally normal	No	6	I feel it makes me to fall asleep faster	
14	Yes	Studies	Studying	2 - 3 hrs	Yes	5	Mentally normal	Yes	4	I feel it makes me to deepening my slee	
15	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	6	Mentally active	Yes	8	I feel it makes me to deepening my slee	
16	Maybe	Studies	Playing Sports	> 5 hrs	Yes	8	Mentally active	Yes	4	I feel it makes me to deepening my slee	
17	Yes	Studies	Playing Sports	4 -5 hrs	Yes	5	Mentally tired	Maybe	8	I can't feel any improvement	
18	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Maybe	8	I feel it makes me to deepening my slee	
19	Yes	Studies	Playing Sports	> 5 hrs	Yes	8	Mentally active	Yes	9	I feel it makes me to deepening my slee	
20	Yes	Studies	Studying	2 - 3 hrs	Yes	3	Mentally active	Yes	5	I feel it makes me to deepening my slee	
21	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	9	Mentally active	Yes	10	I feel it makes me to deepening my slee	
22	No	Sports	Playing Sports	0 - 1 hr	Yes	10	Mentally tired	Yes	3	I feel it makes me to deepening my slee	
23	Yes	Studies	Playing Sports	4 -5 hrs	Yes	7	Mentally active	No	5	I can't feel any improvement	
24	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally normal	Maybe	7	I feel it makes me to deepening my slee	
25	Maybe	Studies	Playing Sports	4 -5 hrs	Yes	9	Mentally normal	Yes	5	I feel it makes me to deepening my slee	
26	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	2	Mentally normal	Yes	7	I feel it makes me to deepening my slee	
27	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Yes	3	I feel it makes me to deepening my slee	
28	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	4	Mentally normal	Yes	6	I feel it makes me to deepening my slee	
29	Yes	Studies	Playing Sports	> 5 hrs	Maybe	6	Mentally active	Yes	2	I feel it makes me to deepening my slee	
30	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally active	Yes	7	I feel it makes me to deepening my slee	
31	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	5	I feel it makes me to fall asleep faster	
32	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	5	Mentally active	Yes	5	I feel it makes me to fall asleep faster	
33	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	9	I feel it makes me to fall asleep faster	
34	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	6	I feel it makes me to deepening my slee	
35	Yes	Studies	Studying	2 - 3 hrs	Yes	4	Mentally active	Yes	7	I feel it makes me to fall asleep faster	
36	Maybe	Studies	Playing Sports	4 -5 hrs	Yes	6	Mentally active	Yes	7	I feel it makes me to fall asleep faster	
37	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally active	Yes	2	I feel it makes me to fall asleep faster	
38	Maybe	Studies	Studying	4 -5 hrs	Maybe	5	Mentally normal	Maybe	2	I feel it makes me to deepening my slee	
39	Yes	Studies	Playing Sports	4 -5 hrs	Yes	5	Mentally active	Yes	8	I feel it makes me to deepening my slee	
40	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	4	Mentally active	Yes	10	I feel it makes me to deepening my slee	
41	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	6	Mentally active	Yes	7	I feel it makes me to fall asleep faster	
42	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	3	Mentally active	Yes	8	I feel it makes me to fall asleep faster	
43	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Maybe	8	I feel it makes me to fall asleep faster	
44	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally normal	Yes	7	I feel it makes me to deepening my slee	
45	Maybe	Studies	Playing Sports	4 -5 hrs	Maybe	7	Mentally normal	No	10	I feel it makes me to deepening my slee	

	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1	Can you manage your tir	Which is more important	Which makes you happie	How long do you usually	By carrying out sports, ar	Based on the previous q	How do you feel after a s	Do you think sports impr	On the scale of 1-10, hov	Based on the previous sleeping rate, hc	
20	Yes	Studies	Studying	2 - 3 hrs	Yes	3	Mentally active	Yes	5	I feel it makes me to deepening my slee	
21	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	9	Mentally active	Yes	10	I feel it makes me to deepening my slee	
22	No	Sports	Playing Sports	0 - 1 hr	Yes	10	Mentally tired	Yes	3	I feel it makes me to deepening my slee	
23	Yes	Studies	Playing Sports	4 -5 hrs	Yes	7	Mentally active	No	5	I can't feel any improvement	
24	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally normal	Maybe	7	I feel it makes me to deepening my slee	
25	Maybe	Studies	Playing Sports	4 -5 hrs	Yes	9	Mentally normal	Yes	5	I feel it makes me to deepening my slee	
26	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	2	Mentally normal	Yes	7	I feel it makes me to deepening my slee	
27	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Yes	3	I feel it makes me to deepening my slee	
28	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	4	Mentally normal	Yes	6	I feel it makes me to deepening my slee	
29	Yes	Studies	Playing Sports	> 5 hrs	Maybe	6	Mentally active	Yes	2	I feel it makes me to deepening my slee	
30	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally active	Yes	7	I feel it makes me to deepening my slee	
31	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	5	I feel it makes me to fall asleep faster	
32	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	5	Mentally active	Yes	5	I feel it makes me to fall asleep faster	
33	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	9	I feel it makes me to fall asleep faster	
34	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally normal	Yes	6	I feel it makes me to deepening my slee	
35	Yes	Studies	Studying	2 - 3 hrs	Yes	4	Mentally active	Yes	7	I feel it makes me to fall asleep faster	
36	Maybe	Studies	Playing Sports	4 -5 hrs	Yes	6	Mentally active	Yes	7	I feel it makes me to fall asleep faster	
37	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	7	Mentally active	Yes	2	I feel it makes me to fall asleep faster	
38	Maybe	Studies	Studying	4 -5 hrs	Maybe	5	Mentally normal	Maybe	2	I feel it makes me to deepening my slee	
39	Yes	Studies	Playing Sports	4 -5 hrs	Yes	5	Mentally active	Yes	8	I feel it makes me to deepening my slee	
40	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	4	Mentally active	Yes	10	I feel it makes me to deepening my slee	
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43	Maybe	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Maybe	8	I feel it makes me to fall asleep faster	
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45	Maybe	Studies	Playing Sports	4 -5 hrs	Maybe	7	Mentally normal	No	10	I feel it makes me to deepening my slee	
46	No	Studies	Playing Sports	2 - 3 hrs	Yes	6	Mentally active	Yes	3	I feel it makes me to fall asleep faster	
47	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	5	Mentally normal	Maybe	9	I feel it makes me to fall asleep faster	
48	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Yes	8	I feel it makes me to fall asleep faster	
49	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	5	Mentally normal	Yes	8	I feel it makes me to fall asleep faster	
50	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	8	Mentally active	Yes	8	I feel it makes me to deepening my slee	
51	Maybe	Studies	Playing Sports	2 - 3 hrs	Maybe	9	Mentally normal	No	4	I can't feel any improvement	
52	Maybe	Studies	Playing Sports	0 - 1 hr	Yes	9	Mentally normal	Yes	5	I feel it makes me to fall asleep faster	
53	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	5	Mentally active	Yes	4	I feel it makes me to deepening my slee	
54	Maybe	Studies	Playing Sports	0 - 1 hr	Maybe	8	Mentally active	Yes	6	I feel it makes me to fall asleep faster	
55	Maybe	Studies	Playing Sports	4 -5 hrs	Yes	8	Mentally active	Yes	8	I feel it makes me to fall asleep faster	
56	Maybe	Studies	Playing Sports	0 - 1 hr	Yes	3	Mentally active	Yes	5	I feel it makes me to fall asleep faster	
57	Yes	Sports	Playing Sports	0 - 1 hr	Yes	5	Mentally active	Yes	6	I feel it makes me to deepening my slee	
58	Yes	Studies	Playing Sports	4 -5 hrs	Yes	8	Mentally active	Yes	5	I feel it makes me to fall asleep faster	
59	Yes	Studies	Studying	> 5 hrs	Yes	2	Mentally normal	Yes	9	I feel it makes me to fall asleep faster	
60	Yes	Studies	Playing Sports	4 -5 hrs	Yes	3	Mentally tired	Yes	8	I feel it makes me to deepening my slee	
61	Yes	Studies	Playing Sports	2 - 3 hrs	Yes	9	Mentally active	Yes	8	I feel it makes me to fall asleep faster	
62											
63											

Survey conducted by Open Access Journal regarding BMI

via antecubital venipuncture in EDTA anticoagulant, performed by a University of Iowa Hospitals and Clinics (UIHC) -trained phlebotomist. After each student removed their shoes and jackets and emptied their pockets, height and weight were measured in meters and kilograms, respectively, using a UIHC-provided Scale-Tronix scale (Welch Allyn, Inc, Skaneateles Falls, NY). In exchange for their participation, each student was given a $20 gift card at the end of their visit. This procedure was repeated in the last week of April and the first week of May 2019, at the end of these students' freshman year.

Laboratory procedures

Blood type testing (ABO, RH, and Lewis) was performed at the DeGowin Blood Center at the University of Iowa Hospitals and Clinics.

Statistics

Data collected from the questionnaires were entered and stored using REDCap Cloud software. BMI was calculated using weight (kg)/height (M^2). Comparisons between categorical and continuous variables were made using Pearson's chi-square and Wilcoxon rank sum tests, respectively. Type I error rate was set at $\alpha = 0.05$. Statistical analysis was performed using SAS version 9.4.

Results

Demographics

The mean BMI of the 200 students was 24.2 (range 16.2-47.5) of whom 8.0% were obese (BMI ≥ 30) and 33.5% were overweight (BMI ≥ 25) or obese. Of the 73 male students, 8.2% were obese and 35.6% were overweight or obese. Of the 127 female students, 7.9% were obese and 32.2% were overweight or obese. Females had a significantly lower BMI than males (p = 0.0441), with a mean female BMI of 23.8 (range 16.2 – 43.9) compared with a mean male BMI of 24.98 (range 18.3 – 47.5).

Of the 200 students, 79.1% were white (155), 7.1% were "other" (14), 6.1% were Asian (12), 6.1% were Hispanic (12), and 1.5% were black (3 subjects). There was no significant relationship between BMI and any of these racial groups (p = 0.1307), nor between BMI and dichotomized categorization of white versus other (p = 0.3157).

73 men). Blood samples from each subject were typed for ABO, RH, and Lewis blood antigens. The distribution of blood types of the students was as follows: Type O 44%, A 34%, B 17%, AB 5%, Rh positive 80%, and Lewis A -, B- 6.6%. Mean BMI was 23.65 for type A (16.25 – 43.89), 24.44 for type B (17.10 – 36.20), 24.98 for type AB (18.81 – 34.79), and 24.31 for type O (18.18 – 47.79). Blood type did not have a significant relationship with BMI for ABO blood type (p = 0.676). The mean BMI for Rh positive students was 24.5 versus 24.05 for Rh negative students (p=0.349). The BMI and percent obese for Lewis A-, B- students was 23.7 and 7.7%, respectively, versus 24.2 and 7.6%, respectively, in Lewis positive students (p=0.73 and p=1.0, respectively), but the number of Lewis A-, B- students was small (n=13).

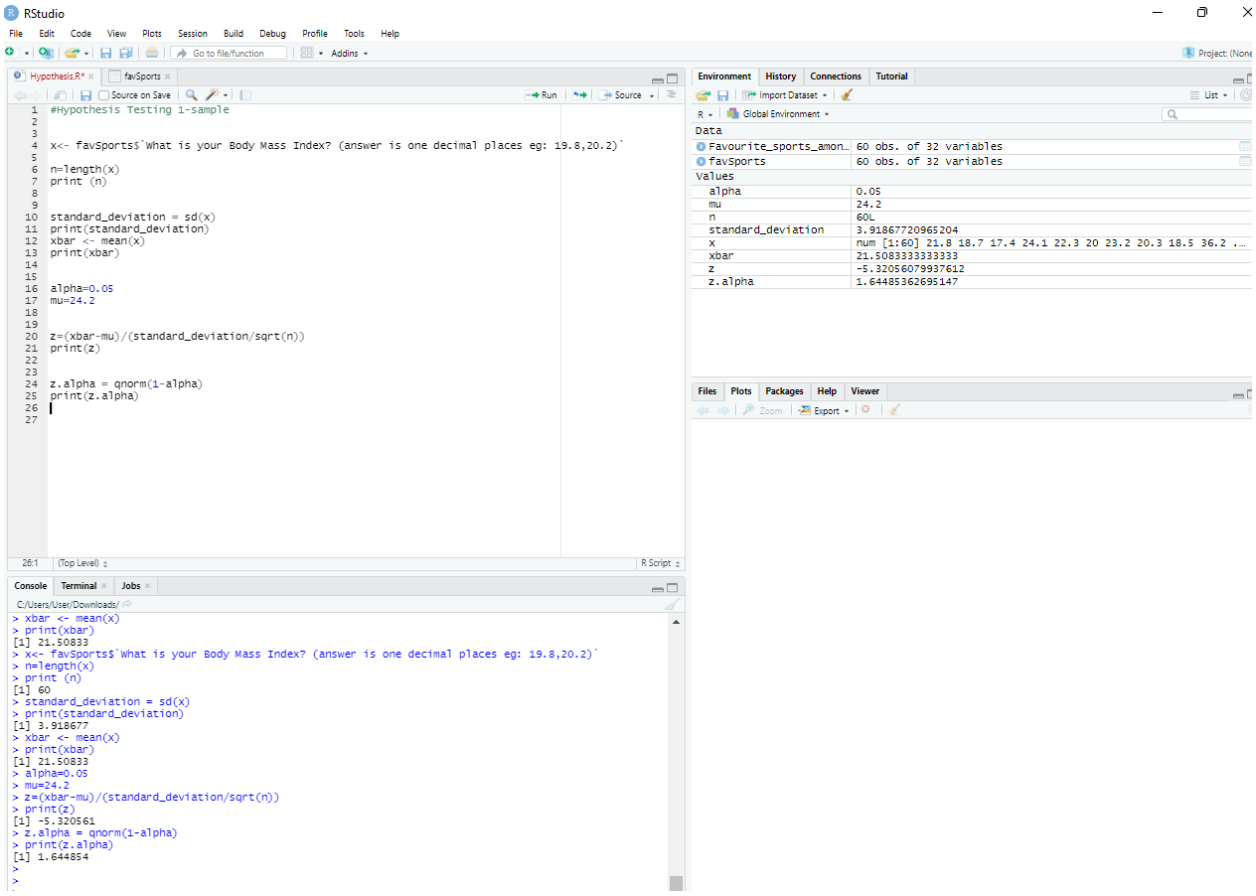
Follow-up results

134 (67%) of the 200 subjects returned for a follow-up visit eight months after the initial visit, of whom 49 (37%) were men and 85 (63%) were women. Repeat measurement of height and weight and calculation of BMI of those with a follow-up visit revealed a significant increase in mean BMI, from 24.24 +/- 4.49 to 24.85 +/- 4.75 (p<0.0001) compared to the BMI of the same 134 students at baseline in the fall. Of the 134 students who followed-up, 9.0% were obese and 40.3% were overweight or obese, compared with 9.0% obese (p = 1.0) and 32.1% overweight or obese (p = 0.1615) at the beginning of the year. Of the 49 male students on follow-up, 14.3% were obese and 46.9% were overweight or obese, compared with 8.2% obese (p = 0.5093) and 34.7% overweight or obese (p = 0.2187) at the beginning of the year. Of the 85 female students on follow-up, 5.9% were obese and 36.5% were overweight or obese, compared with 9.4% obese (p = 0.3843) and 30.6% overweight or obese (p = 0.4179) at the beginning of the year.

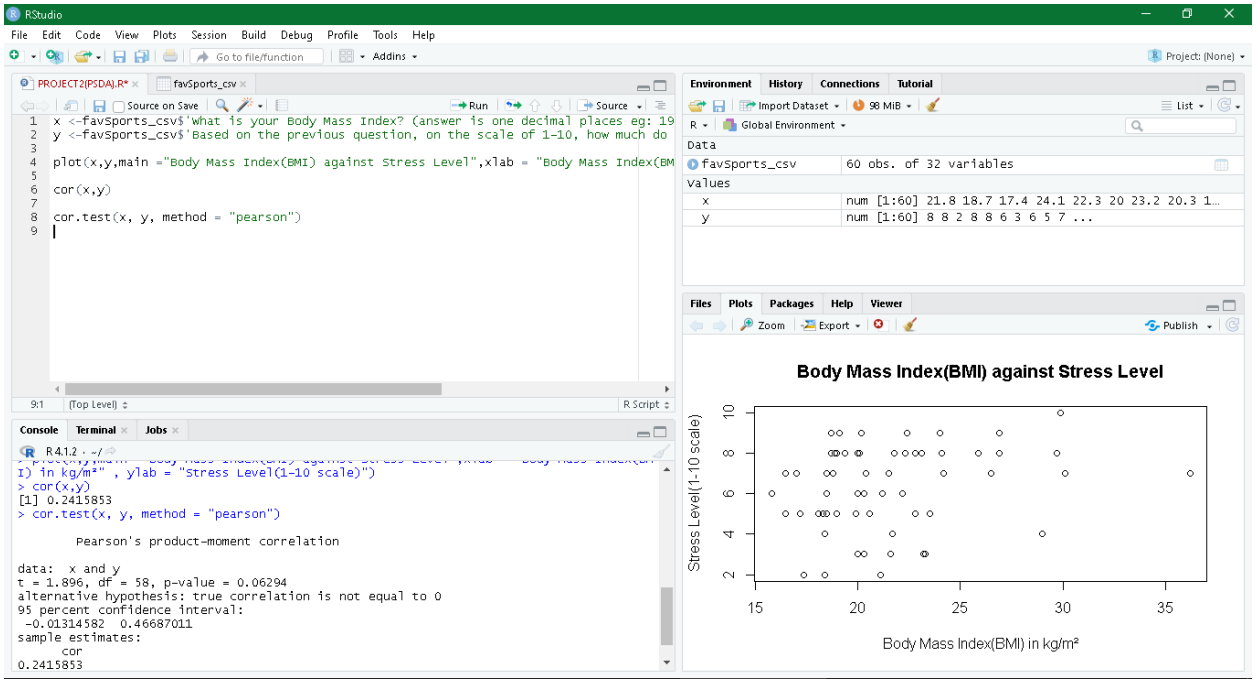
There was a significant increase in weight, with a mean gain of 3.44 lb (p<0.0001). Males showed an increase in BMI from 24.98 to 26.24 (p= 0.0003) with a mean gain of 5.15 lb (range: -12.76 – 24.42) (p=0.0002) and females showed an increase in BMI from 23.77 to 24.48 (p=0.0023) with a mean gain of 2.46 lb (range: -24.86 – 20.02) (p=0.0012). Those who exercised regularly gained an average of 3.32 pounds while those who didn't gain an average of 3.93 pounds (p = 0.5911).

R-studio

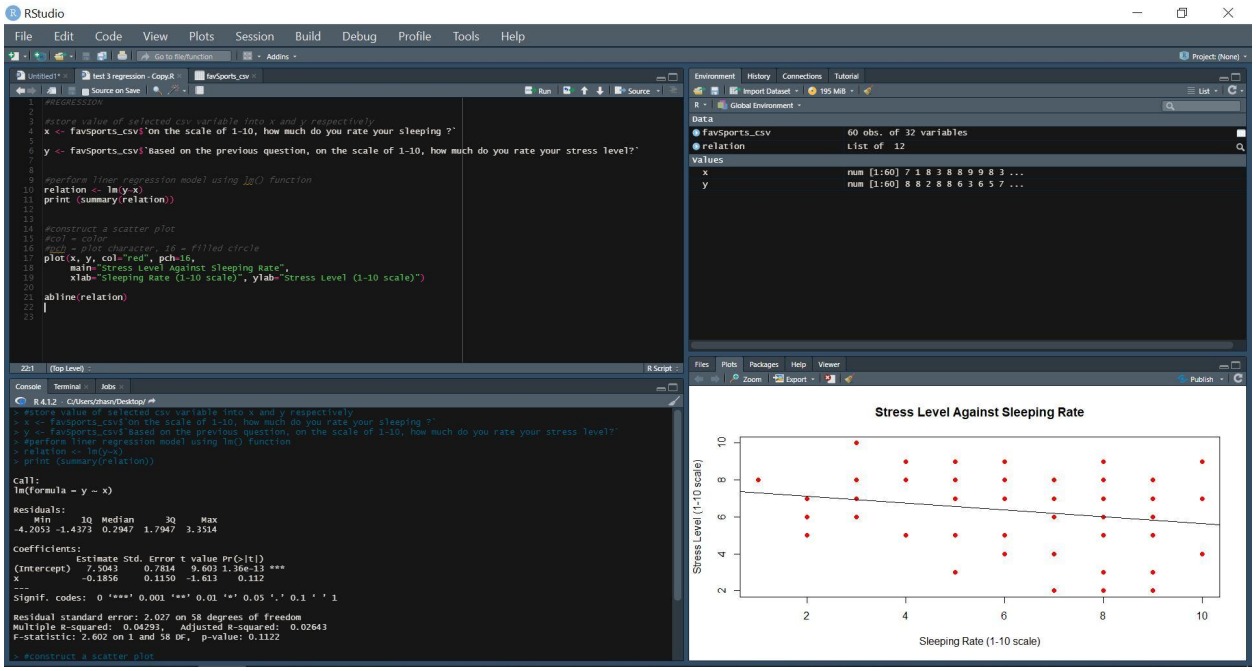
Test 1:



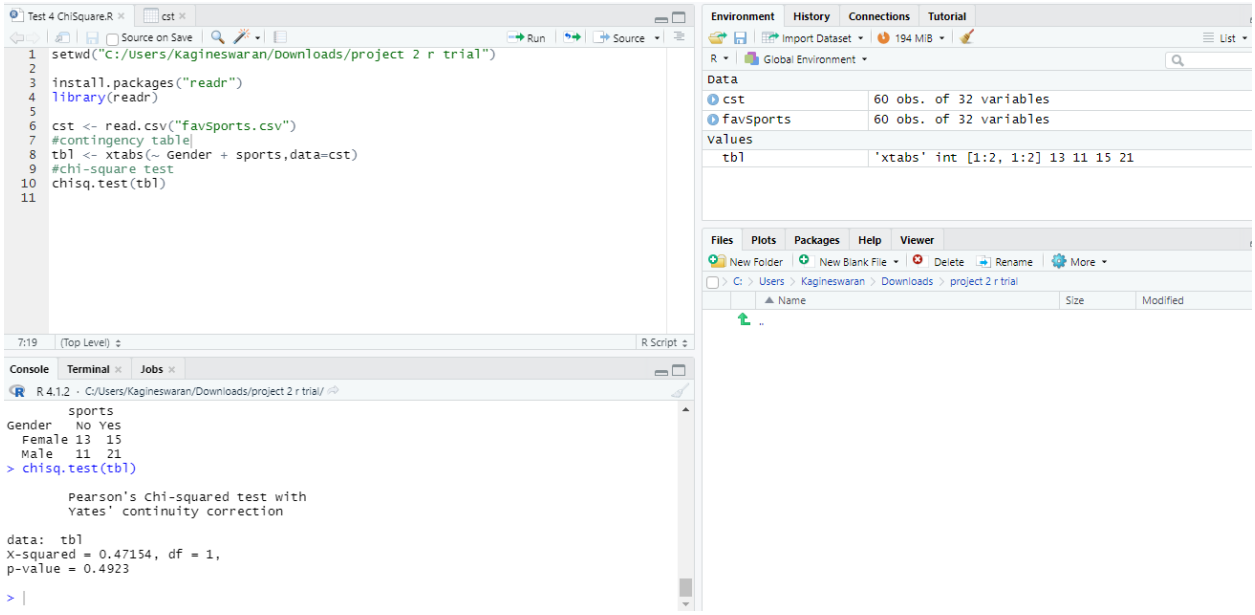
Test 2:


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
PROJECT2(PSDA).R*
favSports_csv
1 x <-favSports_csv$'What is your Body Mass Index? (answer is one decimal places eg: 19
2 y <-favSports_csv$'Based on the previous question, on the scale of 1-10, how much do
3
4 plot(x,y,main ="Body Mass Index(BMI) against Stress Level",xlab = "Body Mass Index(BM
5
6 cor(x,y)
7
8 cor.test(x, y, method = "pearson")
9
Environment History Connections Tutorial
Import Dataset 98 MiB
Global Environment
Data
favSports_csv 60 obs. of 32 variables
Values
x num [1:60] 21.8 18.7 17.4 24.1 22.3 20 23.2 20.3 1...
y num [1:60] 8 8 2 8 8 6 3 6 5 7 ...
Files Plots Packages Help Viewer
Zoom Export Publish
Body Mass Index(BMI) against Stress Level
Stress Level(1-10 scale)
Body Mass Index(BMI) in kg/m²
Console Terminal Jobs
I) in kg/m²" , ylab = "Stress Level(1-10 scale)")
> cor(x,y)
[1] 0.2415853
> cor.test(x, y, method = "pearson")
Pearson's product-moment correlation
data: x and y
t = 1.896, df = 58, p-value = 0.06294
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
-0.01314582 0.46687011
sample estimates:
cor
0.2415853

Test 3:


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
#REGRESSION
#store value of selected csv variable into x and y respectively
x <- favSports_csv$`On the scale of 1-10, how much do you rate your sleeping ?`
y <- favSports_csv$`Based on the previous question, on the scale of 1-10, how much do you rate your stress level?`
#perform linear regression model using lm() function
relation <- lm(y~x)
print (summary(relation))
#construct a scatter plot
#col = color
#pch = plot character, 16 = filled circle
plot(x, y, col="red", pch=16,
main="Stress Level Against Sleeping Rate",
xlab="Sleeping Rate (1-10 scale)", ylab="Stress Level (1-10 scale)")
abline(relation)
Environment History Connections Tutorial
Data
favSports_csv 60 obs. of 32 variables
relation List of 12
Values
x num [1:60] 7 1 8 3 8 8 9 9 8 3 ...
y num [1:60] 8 8 2 8 8 6 3 6 5 7 ...
Stress Level Against Sleeping Rate
Stress Level (1-10 scale)
Sleeping Rate (1-10 scale)
Call:
lm(formula = y ~ x)
Residuals:
Min 1Q Median 3Q Max
-4.2053 -1.4373 0.2947 1.7947 3.3514
Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 7.5043 0.7814 9.603 1.36e-13 ***
x -0.1856 0.1150 -1.613 0.112
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 2.027 on 58 degrees of freedom
Multiple R-squared: 0.04293, Adjusted R-squared: 0.02643
F-statistic: 2.602 on 1 and 58 DF, p-value: 0.1122
#construct a scatter plot

Test 4:


Test 4 ChiSquare.R
cst
Source on Save
Run
Source
setwd("C:/Users/Kagineswaran/Downloads/project 2 r trial")
install.packages("readr")
library(readr)
cst <- read.csv("favSports.csv")
#contingency table
tbl <- xtabs(~ Gender + sports,data=cst)
#chi-square test
chisq.test(tbl)
7:19
(Top Level)
R Script
Console
Terminal
Jobs
R 4.1.2 · C:/Users/Kagineswaran/Downloads/project 2 r trial/
sports
Gender No Yes
Female 13 15
Male 11 21
> chisq.test(tbl)
Pearson's Chi-squared test with
Yates' continuity correction
data: tbl
X-squared = 0.47154, df = 1,
p-value = 0.4923
Environment
History
Connections
Tutorial
Import Dataset
194 MiB
List
R
Global Environment
Data
cst
60 obs. of 32 variables
favSports
60 obs. of 32 variables
Values
tbl
'xtabs' int [1:2, 1:2] 13 11 15 21
Files
Plots
Packages
Help
Viewer
New Folder
New Blank File
Delete
Rename
More
C: > Users > Kagineswaran > Downloads > project 2 r trial
Name
Size
Modified

Reference

1. Marcus, K., Choi, A., Pohl, D., Eyck, P., & Jackson, J. (2020). Body Mass Index of Freshman University Students. *Open Access Journal J Obesity Med Complications*.https://medicine.uiowa.edu/pathology/sites/medicine.uiowa.edu.pathology/files/JOMC-2020-1-103.pdf