SCHOOL OF COMPUTING

Faculty of Engineering

SESSION 2019/2020 SEMESTER 2

SECI2143 - PROBABILITY AND STATISTICAL DATA ANALYSIS
DR SUHAILA MOHAMAD YUSUF

PROJECT 1
R (Programming Language)

SECTION   : 03

NO.	NAME	STUDENT ID
1.	MUHAMMAD NAZREEN BIN MUBIN	A19EC0104
2.	NOOR SYAHIIDAA BINTI ESA	A19EC0199
3.	SYAHMINA FA'IZUN WAZIEN BINTI AMLAN	A19EC0166
4.	WAN MUHAMMAD FIKRI BIN WAN FAUZI	A19EC0175

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INTRODUCTION

Food is an essential part of our lives. It gives us energy and nutrients to grow, to be healthy, active and so on. Food contains carbohydrates, proteins, fat, minerals and vitamins which are useful for the living bodies. In order to get food, we ought to pay for it because nothing is free in this world.

With that being said, we decided to make a survey on the amount of money spent among the computer students of Universiti Teknologi Malaysia(UTM). We also provided a reward of RM10 for random responder where they need to drop their contact number in the Google form in order to participate. We made this reward to help fasten the response from the sample and it took only 3 days to obtain 45 response.

In this report, we show the graph and plots consist of bar chart, pie chart, scatter plot, stem-and-leaf, box plot, frequency distribution and histogram. These graphs help us to represent the data collected and ease the process of explanation on what we conclude from this survey.

Bar chart is used to show how often the students play sports and the type of meals taken by the 45 students. In addition, we used pie chart to represents the gender and scatter plot is used to show the number of heavy meals taken daily. Meanwhile, the stem-and-leaf is used to represent the weight of each students. Other than that, we use box plot to display the average money used for three different places to get food which are food stalls in UTM, outside UTM and food delivery. Last but not least, cumulative frequency distribution graph and histogram is used to represent the average money spent on food monthly by the students.

1. Average money spent by students on food monthly

Table 1

Class interval (RM)	Class boundary	Frequency, f	Midpoint, x	Cumulative frequency	fx	fx^2
51 - 100	50.5 - 100.5	6	75.5	6	453.00	34201.50
101 - 150	100.5 - 150.5	3	125.5	9	376.50	47250.75
151 - 200	150.5 - 200.5	8	175.5	17	1404.00	246402.00
201 - 250	200.5 - 250.5	1	225.5	18	225.50	50850.25
251 - 300	250.5 - 300.5	4	275.5	22	1102.00	303601.00
301 - 350	300.5 - 350.5	6	325.5	28	1953.00	635701.50
351 - 400	350.5 - 400.5	5	375.5	33	1877.50	705001.30
401 - 450	400.5 - 450.5	6	425.5	39	2553.00	1086302.00
451 - 500	450.5 - 500.5	1	475.5	40	475.50	226100.30
501 - 550	500.5 - 550.5	5	525.5	45	2627.50	1380751.00
	Total	45			13047.50	4716161.00

Figure 1

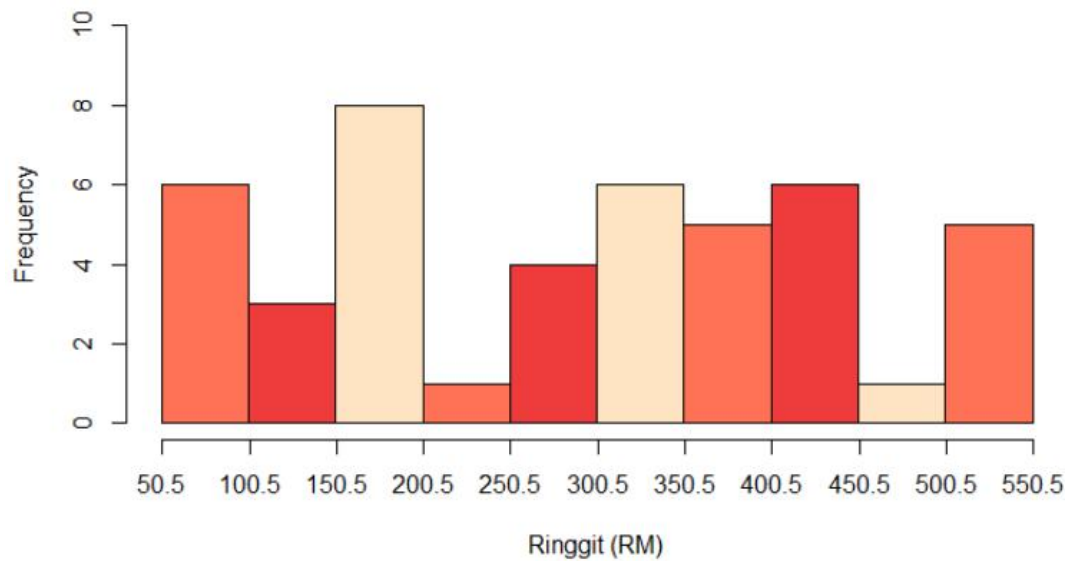Histogram for Average money student spends on food monthly

Figure 2

Cumulative frequency distribution of Average money student spends on food monthly
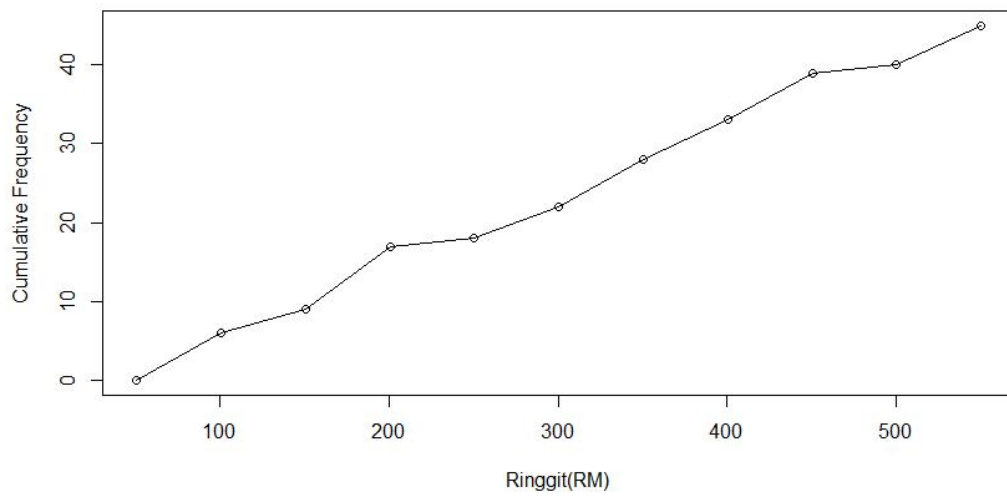
Calculations based on the graph and table

i) Mean, $\bar{x}$:

$$= \frac{13047.5}{45}$$

$$= 289.94$$

ii) Mode:

Class mode: 151 - 200

$$= 150.5 + \left(\frac{5}{5+7}\right)50$$

$$= 171.33$$

iii) Median:

Class median: 301 - 350

$$= \frac{45}{2} = 22.5$$

$$= 300.5 + \left(\frac{22.5-22}{6}\right)50$$

$$= 304.67$$

iv) Variance, s^2:

$$= \frac{1}{44}\left[4716161 - \frac{13047.5^2}{45}\right]$$

$$= 21207.07$$

v) Std deviation, s:

$$= \sqrt{21207.07}$$

$$= 145.63$$

vi) Range:

$=$ Upper class boundary of last interval – Lower class boundary of first interval

$$= 550.5 - 50.5$$

$$= 500$$

Discussion

Firstly, our sample are from 45 UTM's computer students. We collect out data for the average money students spend on food monthly and we choose to represent this data by histogram and frequency table and cumulative frequency distribution.

Table 1 shows our frequency distribution from our data, figure 1 shows our histogram from the data and figure 2 shows our cumulative frequency distribution. Based on table 1, we also made some calculations to see more clearly on the statistic of average money spent by students on food monthly.

Based on table 1 and figure 1 we can see that highest average money spent by the students on food monthly are between RM151 – RM200 with a frequency of 8. From the calculation, we can obtain the mode which is RM171.33. Therefore, we can say that most students spend an average of RM171.33 a month on their food. Next, the least average money spent by the students on food monthly are from 2 classes which are RM201 – RM250 and RM451 – RM500 and both have a frequency of 1.

Based on our calculation, the average money spent by the students is RM289.94. The median class data are between RM301 – RM350 which means the value in the middle lies between this class. The calculation shows that the value of median is RM304.67 proving that the middle value of average money spent by our sample. We also calculate the measure of the dispersion. Based on the calculation, we found out that our variance and standard deviation have a pretty large dispersion.

2. The frequency of students playing sports

Figure 3

A Bar Chart to Show How Often the Students Playing Sports
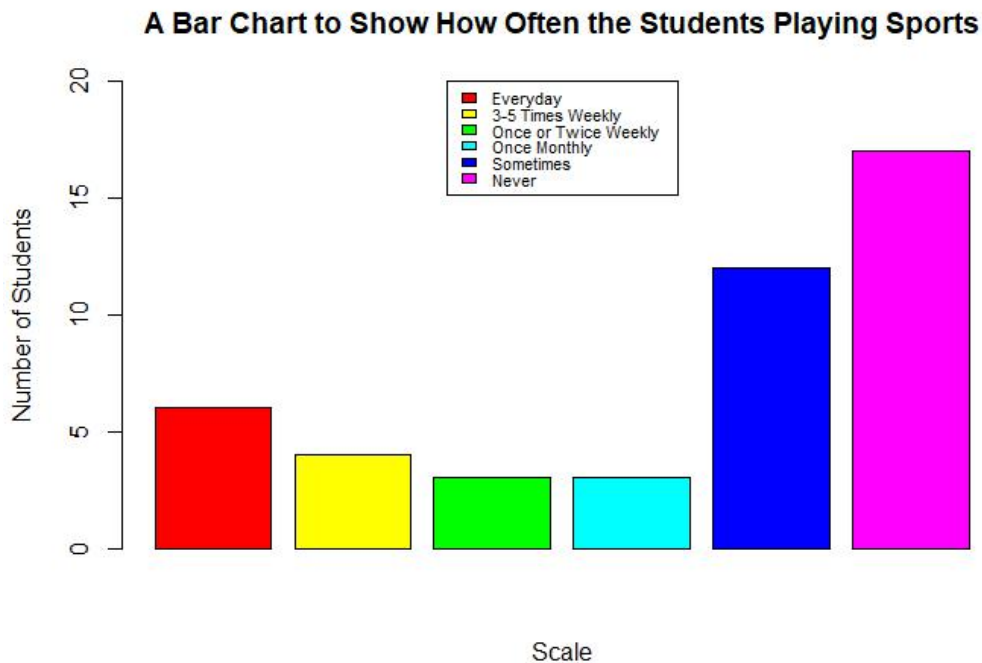
Discussion

According to the bar chart, there are 17 students which never play sports which is the highest one. The least frequency goes to the students who play sports once or twice weekly shares the same frequency as the students who play sports once monthly which has a frequency of 3. There are 12 students who play sports occasionally. Other than that, 4 students play sports three to five times weekly and the rest 6 students play sports everyday.

Athletes who exercise strenuously for more than 60 to 90 minutes every day may need to increase the amount of energy they get from carbohydrates to between 65 and 70 per cent. This bar chart is constructed because we want to know does the average amount of money spent on food monthly affected by either they play sports or not. Since only 10 out of 45 students play sports regularly, assuming the one who plays three to five times a week is considered regular, and the mode for average money spent on food monthly is only RM171.33. We conclude that, the average money spent

on food is indeed affected by either the students play sports or not. Hence, if the students rarely play sports, the average money spent on food will be lower.

3. The percentage of male and female

Figure 4

A Pie Chart of Gender
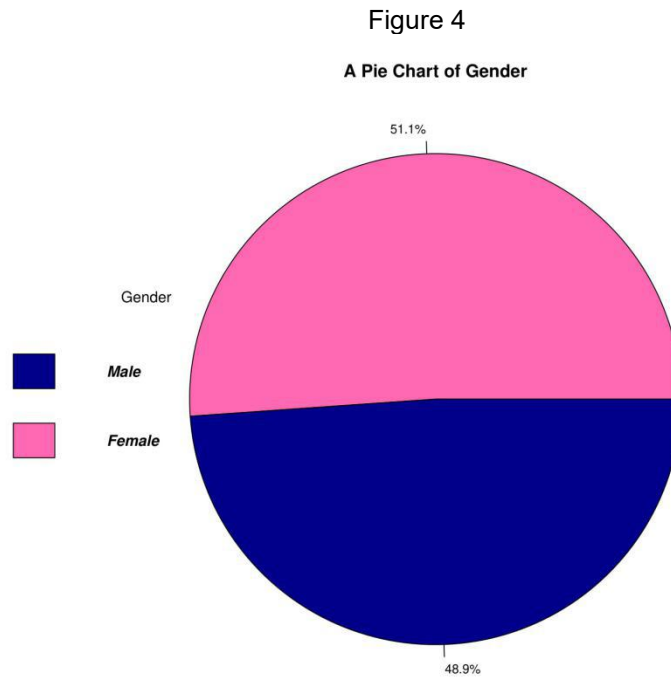
Discussion

The pie chart is showing the percentage of male and female students from the sample. We want to know the relationship between gender and the food consumption. . As we can see, there is only a slight difference between the two genders where 23 of them are female and the rest 22 students are male which are pretty balance. With that being said, we conclude that the average amount of money spent on food monthly is not affected by the genders.

4. Average Money Used for Meals at Certain Places

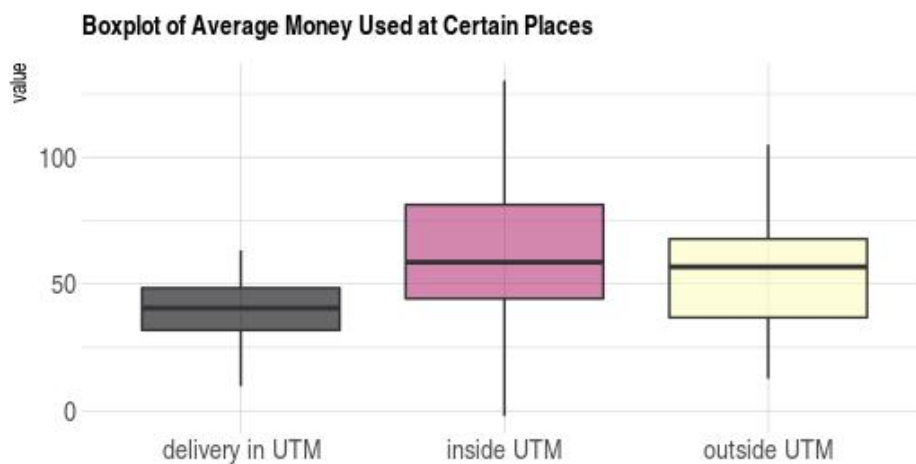|	Inside UTM	Delivery in UTM	Outside UTM
Q1	40.5	35.5	35.5
Q2	55.5	35.5	45.5
Q3	85.5	45.5	60.5
IQR	45.0	10.0	25.0
Lower Fence	-27.0	20.5	-2.0
Upper Fence	153.0	60.5	98.0

Table 2

Figure 5

Discussion

In this study, we represent our findings for average money spent at certain places via histogram. Here we calculate all the statistical data such as first quartile (Q1), second quartile (Q2), third quartile (Q3) and inter quartile range (IQR) to see the description of the data. We also compute the lower fence and upper fence. Based on this box plot, it is shown that most UTM's computer students get their from the stalls inside UTM itself. Our theory is that, eating inside UTM will cost less when compared to outside UTM and buying food through delivery. It is because we will spend more money on grab and the delivery services. In conclusion, since the mode for average money spent on food monthly is only RM171.33, it is concluded that eating inside UTM is indeed a cheaper way to spend the money on food.

5. Type of meals

Table 3

Label	Type of Meals	Frequency
A	Breakfast|Lunch|Supper	1
B	Breakfast|Lunch|Tea|Dinner	2
C	Brunch	1
D	Brunch|Dinner	14
E	Brunch|Elevenses|Dinner	2
F	Brunch|Elevenses|Tea|Dinner	1
G	Brunch|Lunch	1
H	Brunch|Lunch|Dinner	1
I	Brunch|Tea|Dinner	3
J	Dinner	1
K	Elevenses	1
L	Lunch|Dinner|Elevenses	1
M	Lunch|Dinner	2
N	Tea|Dinner|Supper	1

Figure 6
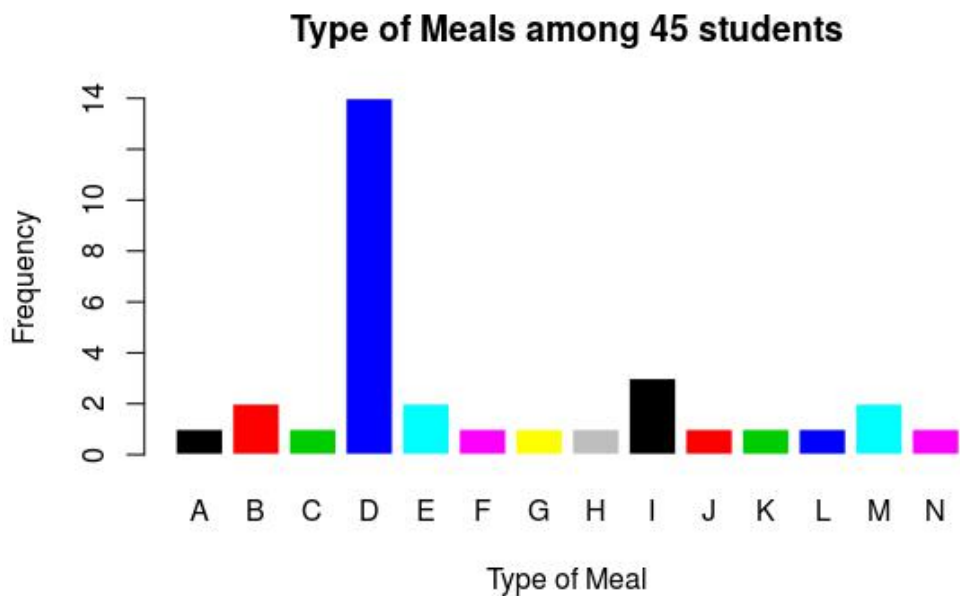
Discussion

The major respondents can be determined by the highest frequency of the type of meal which is 14 students for Brunch|Dinner, followed by 3 students which is Brunch|Tea|Dinner. Some selections are voted twice which are Brunch|Lunch|Tea|Dinner, Brunch|Elevenses|Dinner and also Lunch|Dinner. While,

the other selections was voted once. In conclusion, having the most common meals daily which are brunch and dinner helps the UTM's computer students to reduce the amount of money spend on food.

6. How Many Times Do You Usually Eat Heavy Meals In a Day

Figure 7

Scatter Plot For Number of Students Take Heavy Meals Per Day
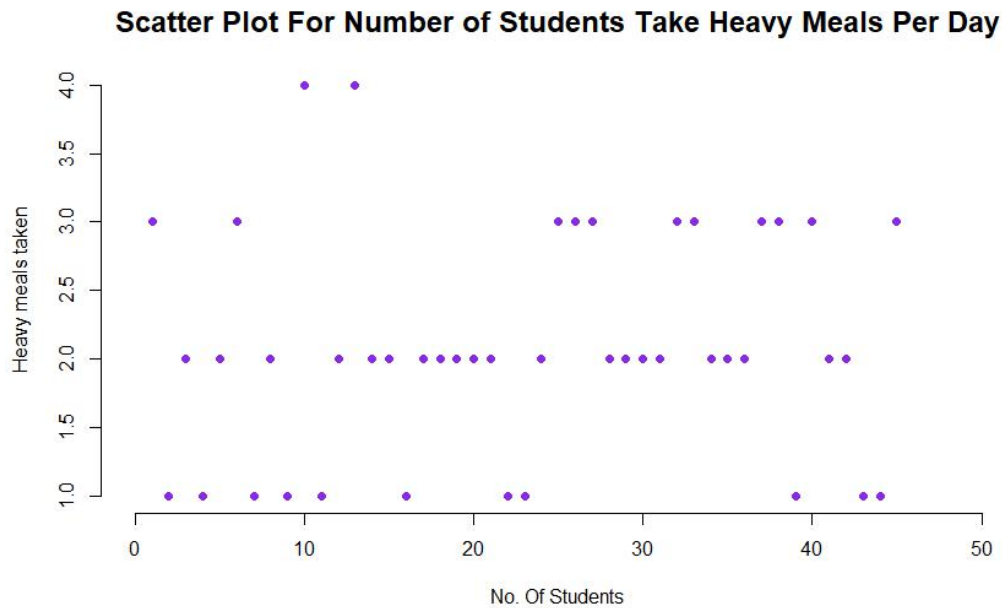
Discussion

In the case of study, 45 first year students of Computer Engineering were recorded from the Google form that we had before. Majority of them takes 2 times heavy meals in a day . Beside that, based on the scatter graph that been plotted, we found out that 25% among of them are having only one or three times only eating their heavy meals. There are two students that takes 4 times heavy meals in a day which contributes 4.44% among the other students. Finally, we can conclude that how many times they eat heavy meals will affect the monthly spent money on food by the UTM's computer students .

7. Weight of UTM's computer students

Table 4

WEIGHT (kg)	PERCENTAGE (%)
Less than 40	2.22
40 - 49	17.78
50 - 59	35.56
More than 59	45.45

Figure 8

```
 3 | 9
 4 | 23577889
 5 | 0023355555667888
 6 | 000257
 7 | 00357
 8 | 00248
 9 | 5
10 | 00
11 | 0
```

KEY: 3 | 9 means 39kg

Discussion

There are 2.22% from our respondents that have weight less than 40 kg which is 39 kg. From the survey we can conclude that 17.78% from the results have weight between 40 kg to 49 kg, 35.56% of them have weight between 50 kg to 59 kg which is the majority of them are in this range. Lastly, 45.45% of UTM's computer students from the sample have weight more than 59kg. We were wondering either people with greater weight will spend more money on food when compared to the one with less weight. Unfortunately, according to this survey, it turns out that the statement is incorrect. It is because the mode for average money spent on food monthly is only RM171.33 and from this stem-and-leaf diagram, the majority of students have weight more than 59 kg.

Conclusion

In conclusion, the average money spent on food is indeed affected by either the students play sports or not. Hence, if the students rarely play sports, the average money spent on food will be much lower. Moreover, the average amount of money spent on food monthly is not affected neither by the genders nor the weight of the UTM's computer students. Besides, since the mode for average money spent on food monthly is only RM171.33, it is concluded that eating inside UTM is indeed a cheaper way to spend the money on food. Furthermore, having the most common meals daily which are brunch and dinner helps the UTM's computer students to reduce the amount of money spend on food. Last but not least, we can conclude that how many times the UTM's computer students eat heavy meals daily will affect their money spent on food monthly.

Appendix

<u>Section 1</u>

1. Gender

    a) Male

    b) Female

2. Age

    a) (short answer text)

3. Weight

    a) (short answer text)

4. Are you an international or local student?

    a) International

    b) Local

5. Current course in UTM

    a) SECP/SCSP

    b) SECR/SCSR

    c) SECB/SCSB

    d) SECJ/SCSJ

    e) SECV/SCSV

6. Contact Number (If you want to grab the chance of winning RM10 cash OR top up)

    a) (short answer text)

<u>Section 2</u>

7. How much average money do you spend for food monthly?

    a) RM50 - RM100

    b) RM101 - RM150

    c) RM151 - RM200

    d) RM201 - RM250

    e) RM251 - RM300

    f) RM301 - RM350

    g) RM351 - RM400

    h) RM401 - RM450

    i) RM 451 - RM500

    j) RM501 - RM550

8. How often do you usually eat at these places?

	Never	Rarely	Sometimes	Often	Always
Inside UTM					
Delivery					
Outside UTM					

9. How much is the average money spent in a WEEK?

	RM31 - RM40	RM41 - RM50	RM51 - RM60	RM61 - RM70	RM71 - RM80	RM81 - RM90	RM91 - RM100	RM101 - RM110
Inside UTM								
Delivery								
Outside UTM								

10. How many times do you usually eat heavy meals in a DAY?

1	2	3	4	5

11. Tick for type of meals you have each DAY.

	Breakfast
	Brunch (Breakfast + Lunch)
	Elevenses (for example: biscuits an coffee around 11 am)
	Lunch
	Tea
	Dinner
	Supper

12. Do you buy drink for the meal?

	Yes
	No

13. If yes, what kind of drink do you have?

	Mineral water
	Sweet drinks

14. Tick for the course of the meal that you have DAILY

	Appetizer
	Main course
	Dessert (ice-cream, etc)

Section 3

15. What kind of sports do you play?

	Jogging
	Cycling
	Basketball
	Rugby
	No
	Others :

16. How often do you play sport?

	Everyday
	3 - 5 times a WEEK
	Once or twice a WEEK
	Once a MONTH
	Sometimes
	Never