

# Data Collation and Presentation

## Classification of data

As before, cross-sectional data can be classified as nominal, ordinal or quantitative.

| Data                                                  |  |                                                        |              |                                                           |  |                                            |
|-------------------------------------------------------|--|--------------------------------------------------------|--------------|-----------------------------------------------------------|--|--------------------------------------------|
| qualitative                                           |  |                                                        | quantitative |                                                           |  |                                            |
| nominal                                               |  | ordinal                                                |              | discrete                                                  |  | continuous                                 |
| Labels for categories                                 |  | Underlying sequence or order                           |              | Only fixed values are possible (often whole numbers only) |  | “proper” numbers with units of measurement |
| Male / female<br>Yes/ No<br>Occupation<br>Nationality |  | Management grade<br>Social class<br>Rankings<br>Rating |              | Number of children                                        |  | Age<br>Salary                              |
| Pie or bar charts                                     |  | Pie or bar charts                                      |              | bar charts                                                |  | Histograms or bar charts                   |

*N.B. We do NOT use line graphs for cross-sectional data.*

Once data has been collected, it must be transformed into a meaningful format.

For primary data, this involves summarising the results of a survey into frequency tables. These tables can be for a single measurement or can be for cross-referenced data. To compile cross-referenced tables you will need to use pivot tables in excel (see IT exercise for pivot tables).

The first step in analysing the data is to draw up frequency tables. This can be done by using pivot tables in excel.

## Graphs:

Points to note:

- Every graph should have a meaningful title.
- For bar charts the vertical and horizontal axes should be labelled.
- For pie charts the labels and percentages should be written next to the sectors.
- The graph should be appropriate to the type of data, e.g. line graphs can only be used for time series data
- Every graph should be self-explanatory; there should be no need to look-up a code/ key/ legend.

## Frequency Tables and Graphs

Example:

Using data collected from the Kidburn Square survey:

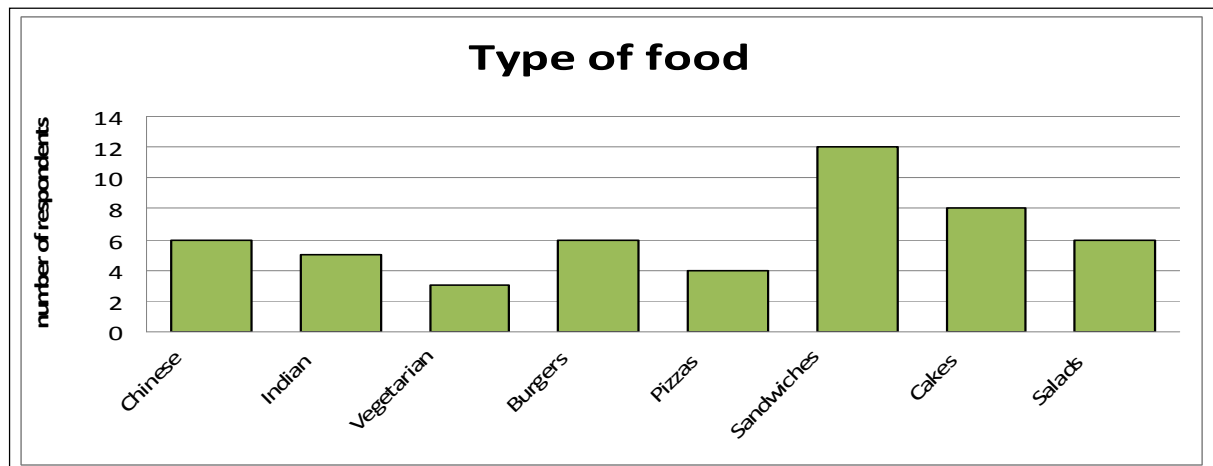
Question 1: This is a nominal question as the answers are just words (or phrases) with no particular order.

|   |                                                                                                           |                                                                                                                                                              |                                                                                                                                                                                                                                                                            |
|---|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | What type of food would you like to eat most often in one of the cafes/ restaurants in the Market Square? | Chinese<br>Indian<br>Vegetarian range<br>Fast food :burgers<br>Fast food: pizzas<br>Sandwiches / Panini<br>Cakes<br>Salads<br>Other, please specify<br>_____ | <input type="checkbox"/> 1<br><input type="checkbox"/> 2<br><input type="checkbox"/> 3<br><input type="checkbox"/> 4<br><input type="checkbox"/> 5<br><input type="checkbox"/> 6<br><input type="checkbox"/> 7<br><input type="checkbox"/> 8<br><input type="checkbox"/> 9 |
|---|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Frequency table

| Type of food preferred | Count of respondent |
|------------------------|---------------------|
| Chinese                | 6                   |

|                     |           |
|---------------------|-----------|
| Indian              | 5         |
| Vegetarian          | 3         |
| Burgers             | 6         |
| Pizzas              | 4         |
| Sandwiches / Panini | 12        |
| Cakes               | 8         |
| Salads              | 6         |
| <b>Grand Total</b>  | <b>50</b> |



N.B. The bar chart has the labels on the graph and the vertical axis is labelled in a non-technical manner.

### Report

The most common type of food that the respondents indicated they would want to eat most often in the Kidburn Square cafes was sandwiches and Panini. 24% of the respondents identified this as their first choice of food. The next most popular type of food was cakes, identified by 16% of the respondents. There appears to be a rather low level of demand for main meals such as those provided by Indian and Chinese restaurants.

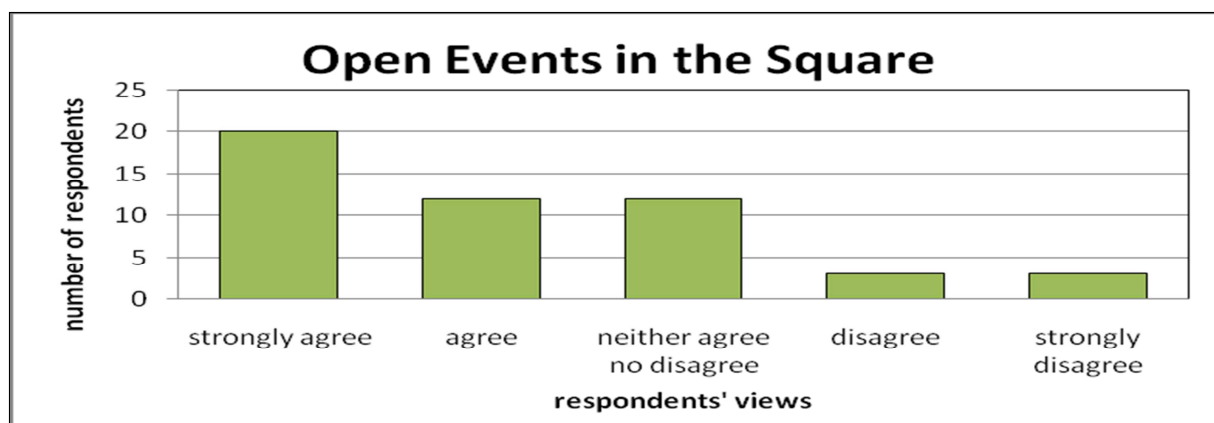
These results would indicate that the type of cafe that would be most popular would be one serving snacks rather than full meals.

Question 5: This is an ordinal question as the answers have a definite order to them.

|   |                                                                                                                                    |                                                                                        |                                                                                                                                                    |
|---|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | There is currently a proposal to use the open area of the Market Square for local events.<br>What are your views on this proposal? | Strongly agree<br>Agree<br>Neither agree nor disagree<br>Disagree<br>Strongly disagree | <input type="checkbox"/> 1<br><input type="checkbox"/> 2<br><input type="checkbox"/> 3<br><input type="checkbox"/> 4<br><input type="checkbox"/> 5 |
|---|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|

Frequency table

| Views on proposal          | Count of respondent |
|----------------------------|---------------------|
| Strongly agree             | 20                  |
| agree                      | 12                  |
| Neither agree nor disagree | 12                  |
| disagree                   | 3                   |
| Strongly disagree          | 3                   |
| <b>Grand Total</b>         | <b>50</b>           |



*Note: The bars are not “joined up” as the data is ordinal.*

#### Report

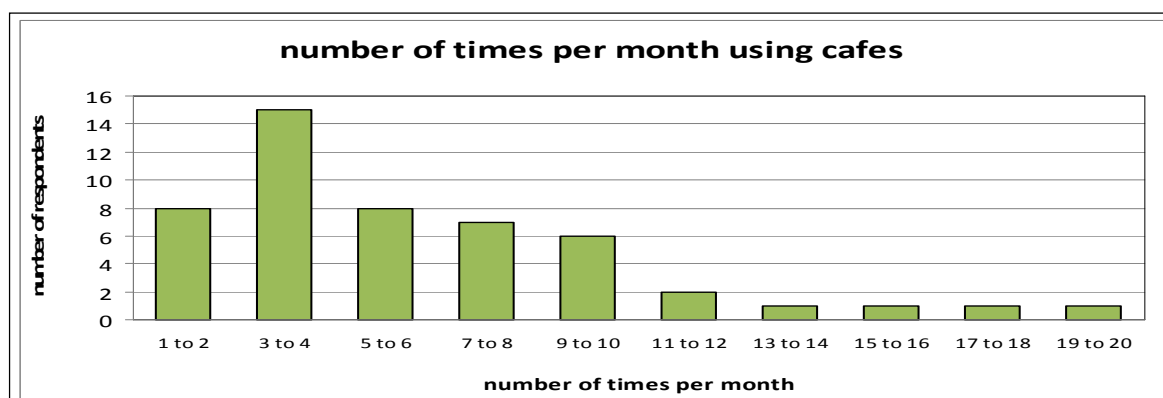
*When asked if they agreed with a proposal to hold local events in the market square, 40% of respondents “strongly agreed” with the proposal and a further 24% “agreed” with the idea. Thus, in total, 64 % of the respondents expressed a positive view on the proposal to hold events.*

*This would indicate that the local traders should pursue the proposal to hold local events in the Market Square.*

Question 2: This is a quantitative question as the answers are actual numbers (not codes)

|   |                                                                                                                                                    |                                                      |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 2 | How many times a month would you use the cafes/ restaurants in the Market Square if they served the type of food you have identified in question 1 | Please write in the number of times a month<br>----- |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|

| Times a month      | Count of respondent |
|--------------------|---------------------|
| 1-2                | 8                   |
| 3-4                | 15                  |
| 5-6                | 8                   |
| 7-8                | 7                   |
| 9-10               | 6                   |
| 11-12              | 2                   |
| 13-14              | 1                   |
| 15-16              | 1                   |
| 17-18              | 1                   |
| 19-20              | 1                   |
| <b>Grand Total</b> | <b>50</b>           |



#### Report

The most common number of times that respondents expected to use cafes was 3 or 4 times a month, with 30% of respondents giving this answer. A total of 60% of respondents indicated that they expected to use the cafes between 3 and 8 times a month. Only 12% of respondents thought that they would use the cafes more than 10 times a month. These results seem to suggest that most respondents would use the cafes about once or twice a week.

*Note: For this question, we would go on to talk about some statistics*

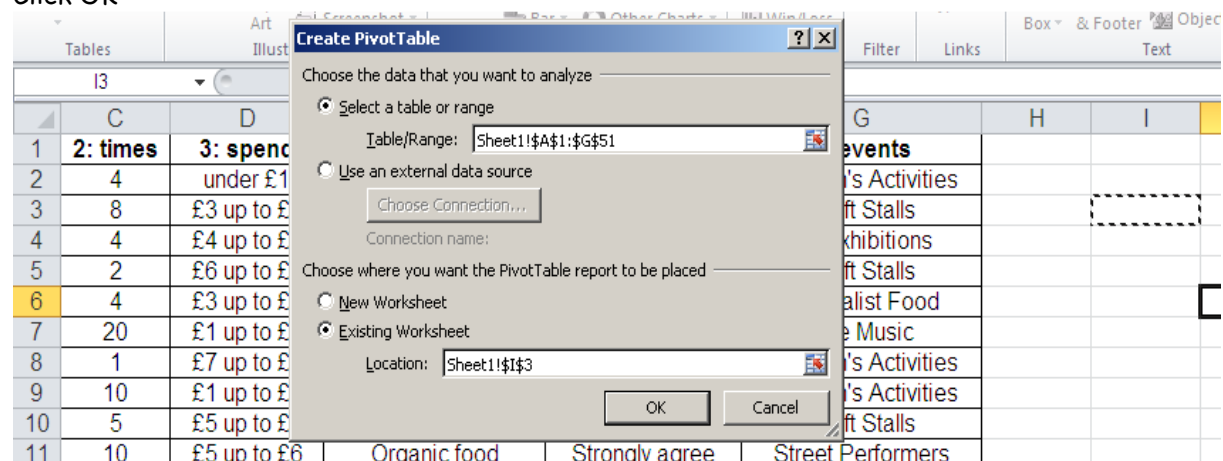
## IT Worksheet

Use excel to produce frequency tables and graphs from the Kidburn data file. The file can be found from weblearn as "kidburn" in the "Excel data files" folder.

### Using pivot tables to create frequency tables

1. Load the file kidburn from weblearn.
2. Click on the "insert" tab
3. Choose **pivot table**
4. Highlight the entire data table including the headings
5. Click on an empty cell for "location"

Click OK



Drag "1: food" into the row labels box

Drag "1: food" into the  $\Sigma$  box make sure it comes up as "count"

|   | Group             | Sort & Filter     | Data                  | Actions | Tools                                        | Show |
|---|-------------------|-------------------|-----------------------|---------|----------------------------------------------|------|
|   | Count of 1: food  |                   |                       |         |                                              |      |
|   | E                 | F                 | G                     | H       | PivotTable Field List                        |      |
|   | 4: shop           | 5: proposal       | 6: events             |         |                                              |      |
|   | Clothes:children  | Strongly agree    | Children's Activities |         | Choose fields to add to report:              |      |
| 4 | books/video/music | Disagree          | Craft Stalls          |         |                                              |      |
| 5 | Organic food      | Strongly agree    | Art Exhibitions       |         | <input type="checkbox"/> respondent          |      |
| 7 | Clothes:men       | Neither           | Craft Stalls          |         |                                              |      |
| 4 | Clothes:men       | Strongly agree    | Specialist Food       |         | <input checked="" type="checkbox"/> 1: food  |      |
| 2 | books/video/music | Strongly agree    | Live Music            |         | <input type="checkbox"/> 2: times            |      |
| 8 | Haberdashery      | Neither           | Children's Activities |         | <input type="checkbox"/> 3: spend            |      |
| 2 | Delicatessen      | Agree             | Children's Activities |         | <input type="checkbox"/> 4: shop             |      |
| 6 | Clothes:men       | Strongly disagree | Craft Stalls          |         | <input type="checkbox"/> 5: proposal         |      |
| 6 | Organic food      | Strongly agree    | Street Performers     |         | <input type="checkbox"/> 6: events           |      |
| 3 | Clothes:women     | Neither           | Children's Activities |         | Drag fields between areas below:             |      |
| 6 | books/video/music | Agree             | Specialist Food       |         |                                              |      |
| 3 | Clothes:men       | Disagree          | Art Exhibitions       |         | Report Filter                                |      |
| 4 | Clothes:women     | Neither           | Children's Activities |         | Column Labels                                |      |
| 9 | Delicatessen      | Strongly agree    | Specialist Food       |         | Row Labels                                   |      |
| 3 | books/video/music | Strongly agree    | Craft Stalls          |         | Values                                       |      |
| 5 | Haberdashery      | Strongly agree    | Live Music            |         | 1: food                                      |      |
| 7 | Clothes:men       | Agree             | Specialist Food       |         | Count of 1: f...                             |      |
| 2 | books/video/music | Strongly agree    | Children's Activities |         | <input type="checkbox"/> Defer Layout Update |      |
| 3 | books/video/music | Strongly disagree | Craft Stalls          |         | Update                                       |      |
| 4 | Clothes:children  | Neither           | Specialist Food       |         |                                              |      |
| 3 | Clothes:children  | Strongly agree    | Live Music            |         |                                              |      |
| 8 | Clothes:children  | Agree             | Specialist Food       |         |                                              |      |
| 3 | Clothes:men       | Agree             | Children's Activities |         |                                              |      |
| 7 | Clothes:women     | Strongly agree    | Specialist Food       |         |                                              |      |

The resulting table will now look like:

|                  |       |
|------------------|-------|
| Count of 1: food |       |
| 1: food          | Total |
| Burgers          | 6     |
| Cakes            | 8     |
| Chinese          | 6     |
| Indian           | 5     |
| Pizzas           | 4     |
| Salads           | 6     |
| Sandwiches       | 12    |
| Vegetarian       | 3     |
| Grand Total      | 50    |

**To produce a frequency table with grouped data.**

The first few steps are the same as before. For this example we have used the results on the number of times a month the cafes are used

When we create the pivot table the  $\Sigma$  values box comes up with "sum of times", we have to change this to "count" by choosing "values field setting" and selecting "count"

The screenshot shows an Excel spreadsheet with a PivotTable. The PivotTable is located in the range F5:G26. The PivotTable Fields task pane on the right shows the following setup:

- Report Filter:** 2: times
- Column Labels:** Sum of 2: times
- Row Labels:** (empty)
- Values:** (empty)

The Value Field Settings dialog box is open, showing the following details:

- Source Name:** 2: times
- Custom Name:** Count of 2: times
- Summarize Values By:** Count
- Summarize value field by:** Choose the type of calculation that you want to use to summarize data from the selected field. The list includes Sum, Count, Average, Max, Min, and Product. Count is selected.

The background spreadsheet shows data for various food items and their prices, categorized by '2: times'.

The initial output looks like:

| Count of 2: times |       |
|-------------------|-------|
| 2: times          | Total |
| 1                 | 2     |
| 2                 | 6     |
| 3                 | 3     |
| 4                 | 12    |
| 5                 | 5     |
| 6                 | 3     |
| 8                 | 7     |
| 10                | 6     |
| 11                | 1     |
| 12                | 1     |
| 14                | 1     |
| 15                | 1     |
| 18                | 1     |
| 20                | 1     |
| Grand Total       | 50    |

In order to "group" the data:

Right Click on the table produced  
Choose "group" from the pivot table options

| F                 | G                     | H | I           | J  | K | L |
|-------------------|-----------------------|---|-------------|----|---|---|
| Agree             | Specialist Food       |   | Grand Total | 50 |   |   |
| Disagree          | Art Exhibitions       |   |             |    |   |   |
| Neither           | Children's Activities |   |             |    |   |   |
| Strongly agree    | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Craft Stalls          |   |             |    |   |   |
| Strongly agree    | Live Music            |   |             |    |   |   |
| Agree             | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Children's Activities |   |             |    |   |   |
| Strongly disagree | Craft Stalls          |   |             |    |   |   |
| Neither           | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Live Music            |   |             |    |   |   |
| Agree             | Specialist Food       |   |             |    |   |   |
| Agree             | Children's Activities |   |             |    |   |   |
| Strongly agree    | Specialist Food       |   |             |    |   |   |
| Agree             | Live Music            |   |             |    |   |   |
| Neither           | Children's Activities |   |             |    |   |   |
| Agree             | Street Performers     |   |             |    |   |   |
| Agree             | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Children's Activities |   |             |    |   |   |
| Strongly agree    | Live Music            |   |             |    |   |   |
| Agree             | Live Music            |   |             |    |   |   |
| Disagree          | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Specialist Food       |   |             |    |   |   |
| Strongly agree    | Children's Activities |   |             |    |   |   |

The display automatically set the "starting at" as 1 (the smallest number in the data set) and "ending at" as 20 (the largest number in the set).  
Choose 2 as the value for "by". This will give us classes ( 1 to 2, 3 to 4, etc.)  
The resulting table will now look like:

| Count of 2: times | Total |
|-------------------|-------|
| 2: times          | Total |
| 1-2               | 8     |
| 3-4               | 15    |
| 5-6               | 8     |
| 7-8               | 7     |
| 9-10              | 6     |
| 11-12             | 2     |
| 13-14             | 1     |
| 15-16             | 1     |
| 17-18             | 1     |
| 19-20             | 1     |
| Grand Total       | 50    |

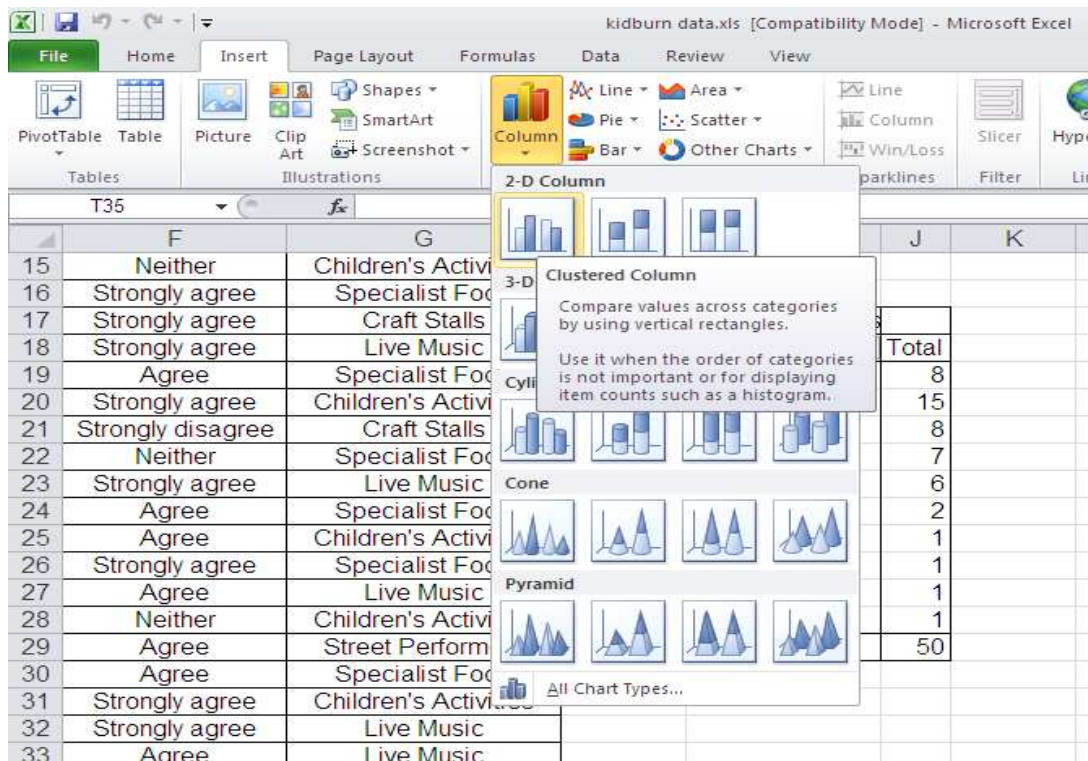
## Drawing Graphs from Frequency tables

The last table produced was for the number of times the cafes will be used each month. To produce a graph for this question:

Choose **Insert** tab

Choose **Column** graphs

Choose the first graph from the top row.

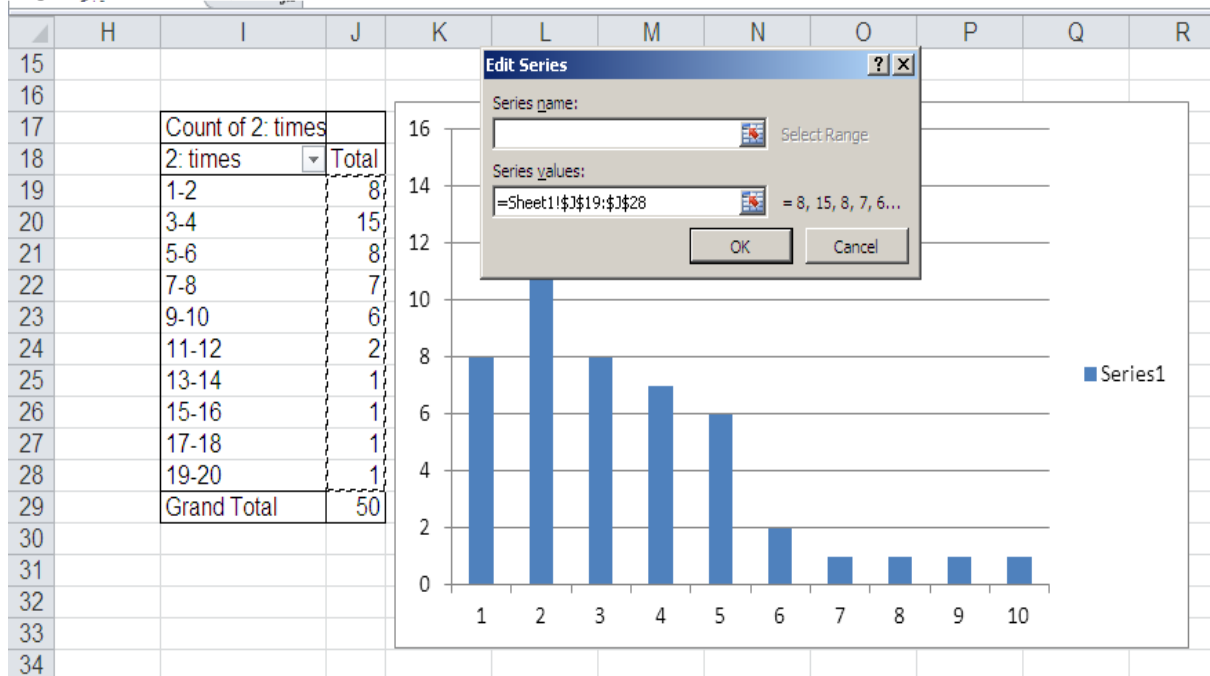


Right click on the empty graph outline

Choose "select data"

Choose "add" from the left-hand side box

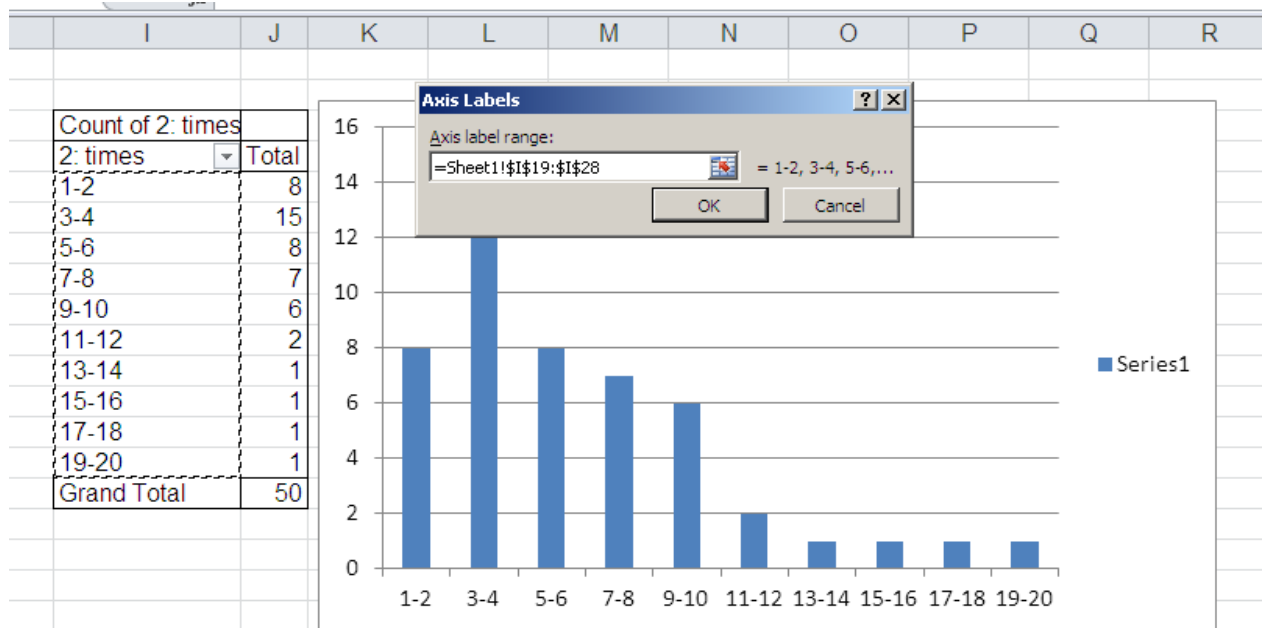
Highlight the frequencies as the series values box [delete "=", first]



Click Ok

And then click on "edit" in the right hand side box

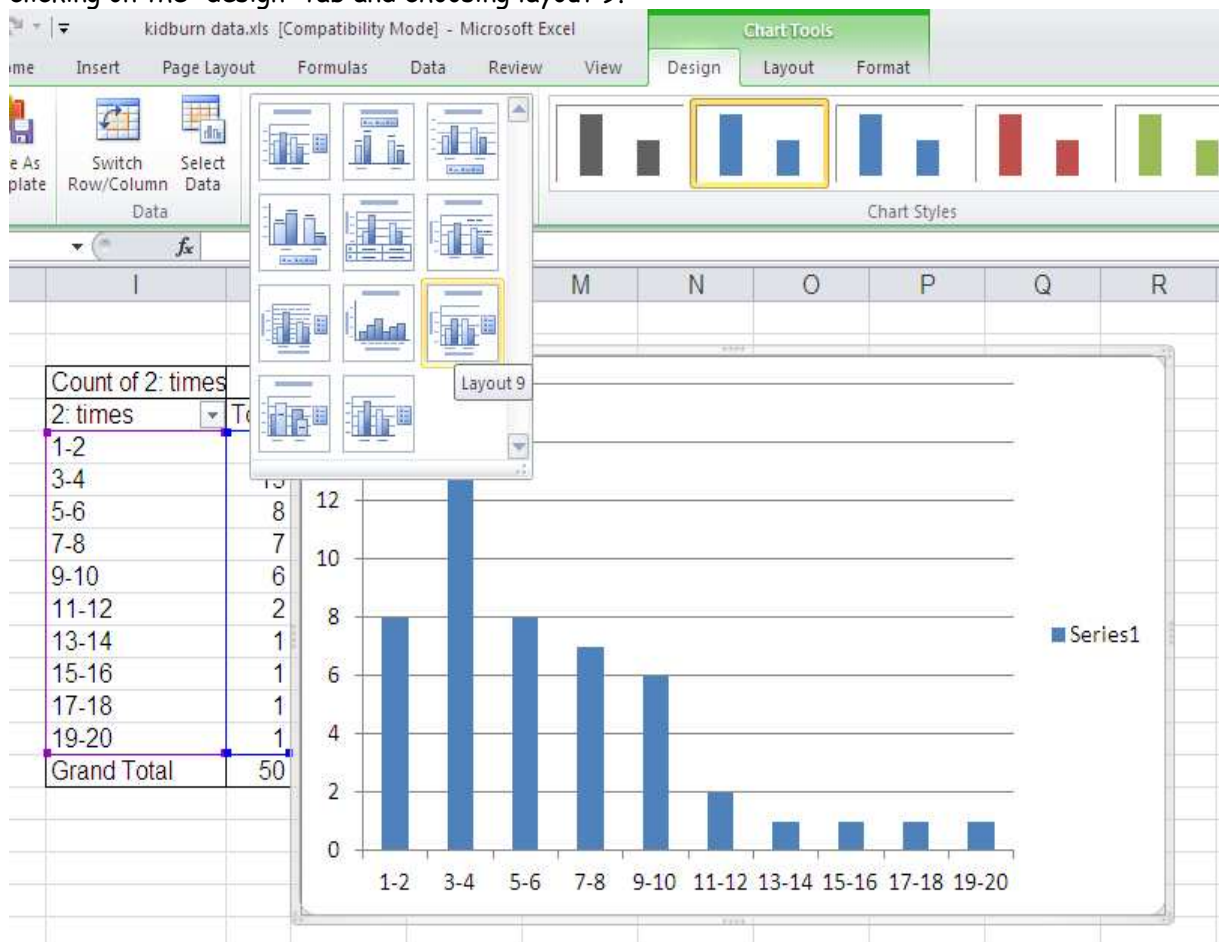
Highlight the labels (1 to 2, 3 to 4 etc.)

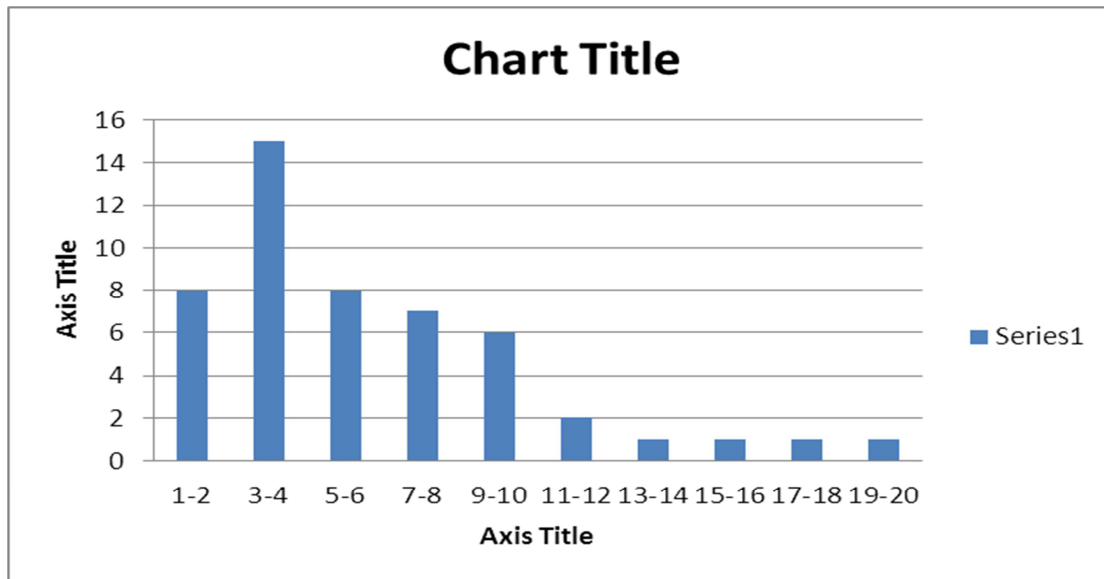


Click Ok

Click OK.

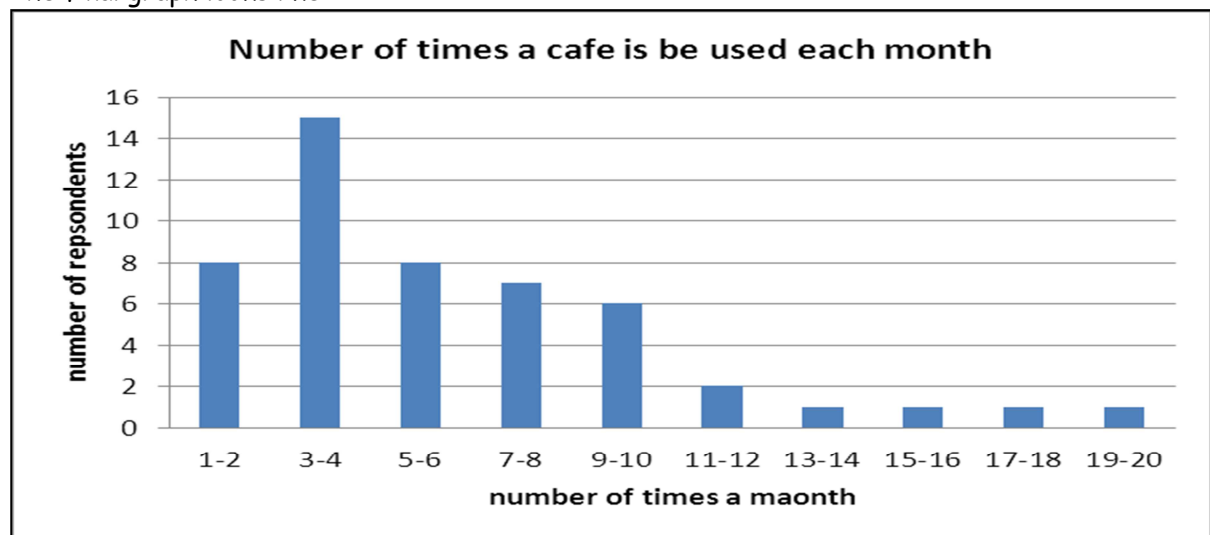
The graph can now be edited to include titles by selecting the design we prefer. This is done by clicking on the "design" tab and choosing layout 9.





We can over-type relevant titles and axis labels as well as deleting the "series 1 " legend.

The final graph looks like:



### Using Pivot to produce cross-tabulated tables.

Cross-tabulated, or two-way frequency, tables are used to compare the answers to 2 different questions.

Using the kidburn data file:

Click on any cell in the data file

Using the **insert** data tab, choose **pivot tables**

In the box marked **existing worksheet, location**, click on any blank cell where there is room on the spreadsheet.

Microsoft Excel - kidburn data.xls [Compatibility Mode]

File Home Insert Page Layout Formulas Data Review View

PivotTable Table Picture Clip Art Screenshot Illustrations Column Bar Charts

Tables: C11, 10

|    | A  | B          | C  | D           |
|----|----|------------|----|-------------|
| 13 | 12 | Chinese    | 2  | £5 up to £6 |
| 14 | 13 | Burgers    | 5  | £2 up to £3 |
| 15 | 14 | Salads     | 4  | £3 up to £4 |
| 16 | 15 | Indian     | 3  | £8 up to £9 |
| 17 | 16 | Pizzas     | 5  | £2 up to £3 |
| 18 | 17 | Salads     | 8  | £4 up to £5 |
| 19 | 18 | Chinese    | 2  | £6 up to £7 |
| 20 | 19 | Sandwiches | 15 | £1 up to £2 |
| 21 | 20 | Cakes      | 5  | £2 up to £3 |
| 22 | 21 | Burgers    | 4  | £3 up to £4 |
| 23 | 22 | Sandwiches | 14 | £2 up to £3 |
| 24 | 23 | Chinese    | 3  | £7 up to £8 |

**Create PivotTable**

Choose the data that you want to analyze

☒ Select a table or range  
Table/Range: Sheet1!\$A\$1:\$G\$51

☐ Use an external data source  
Choose Connection...  
Connection name:

Choose where you want the PivotTable report to be placed

☐ New Worksheet  
☒ Existing Worksheet  
Location: Sheet1!\$I\$32

OK Cancel

|                  |                |              |
|------------------|----------------|--------------|
| Clothes:children | Neither        | Specialist F |
| Clothes:children | Strongly agree | Live Mus     |
| Clothes:children | Agree          | Specialist F |

Click OK

If we wish to see how the amount spent relates to the type of food chosen:

Drag **food** into the row labels box and drag **spent** into the column labels box. We can then drag **respondent** into the  $\Sigma$  labels box.

We need to change the "sum of respondents" to count of respondents", by clicking on "sum of respondents" and choosing **count** from the value field settings option.

f respondent

| C  | D           | E                 | F                 |
|----|-------------|-------------------|-------------------|
| 2  | £5 up to £6 | books/video/music | Agree             |
| 5  | £2 up to £3 | Clothes:men       | Disagree          |
| 4  | £3 up to £4 | Clothes:women     | Neither           |
| 3  | £8 up to £9 | Delicatessen      | Strongly agree    |
| 5  | £2 up to £3 | books/video/music | Strongly agree    |
| 8  | £4 up to £5 | Haberdashery      | Strongly agree    |
| 2  | £6 up to £7 | Clothes:men       | Agree             |
| 15 | £1 up to £2 | books/video/music | Strongly agree    |
| 5  | £2 up to £3 | books/video/music | Strongly disagree |
| 4  | £3 up to £4 | Clothes:children  | Neither           |
| 14 | £2 up to £3 | Clothes:children  | Strongly agree    |
| 3  | £7 up to £8 | Clothes:children  | Agree             |
| 10 | £2 up to £3 | Clothes:men       | Agree             |
| 4  | £6 up to £7 | Clothes:women     | Strongly agree    |
| 6  | under £1    | Delicatessen      | Agree             |
| 10 | £2 up to £3 | Clothes:children  | Neither           |
| 1  | £5 up to £6 | books/video/music | Agree             |
| 10 | £4 up to £5 | Clothes:men       | Agree             |
| 4  | £3 up to £4 | Delicatessen      | Strongly agree    |
| 4  | £2 up to £3 | Clothes:women     | Strongly agree    |
| 2  | £1 up to £2 | Haberdashery      | Agree             |
| 4  | £4 up to £5 | Clothes:men       | Disagree          |
| 2  | £6 up to £7 | Organic food      | Strongly agree    |
| 18 | £1 up to £2 | Clothes:children  | Strongly agree    |
| 8  | £1 up to £2 | Clothes:children  | Neither           |
| 8  | £4 up to £5 | Organic food      | Strongly agree    |

**PivotTable Field List**

Choose fields to add to report:

- ☒ respondent
- ☒ 1: food
- ☐ 2: times
- ☒ 3: spend
- ☐ 4: shop
- ☐ 5: proposal
- ☐ 6: events

Drag fields between areas below:

Report Filter: [Empty]

Column Labels: 3: spend

Row Labels: 1: food

$\Sigma$  Values: Count of resp...

☐ Defer Layout Update

Update

Choose OK, then close the pivot table dialogue box.

The final table looks like:

| Count of<br>respondent | 3:<br>spend |             |             |             |             |             |             |             |          |             |
|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|-------------|
| 1: food                | £1 up to £2 | £2 up to £3 | £3 up to £4 | £4 up to £5 | £5 up to £6 | £6 up to £7 | £7 up to £8 | £8 up to £9 | under £1 | Grand Total |
| Burgers                |             | 3           | 2           | 1           |             |             |             |             |          | 6           |
| Cakes                  | 5           | 1           |             |             |             |             |             |             | 2        | 8           |
| Chinese                |             |             |             |             | 2           | 3           | 1           |             |          | 6           |
| Indian                 |             |             |             |             |             | 1           | 2           | 2           |          | 5           |
| Pizzas                 |             | 2           |             | 1           | 1           |             |             |             |          | 4           |
| Salads                 |             | 2           | 2           | 2           |             |             |             |             |          | 6           |
| Sandwiches             | 4           | 7           | 1           |             |             |             |             |             |          | 12          |
| Vegetarian             |             |             | 1           | 1           | 1           |             |             |             |          | 3           |
| Grand Total            | 9           | 15          | 6           | 5           | 4           | 4           | 3           | 2           | 2        | 50          |