

COMP1022Q

Introduction to Computing with Excel VBA

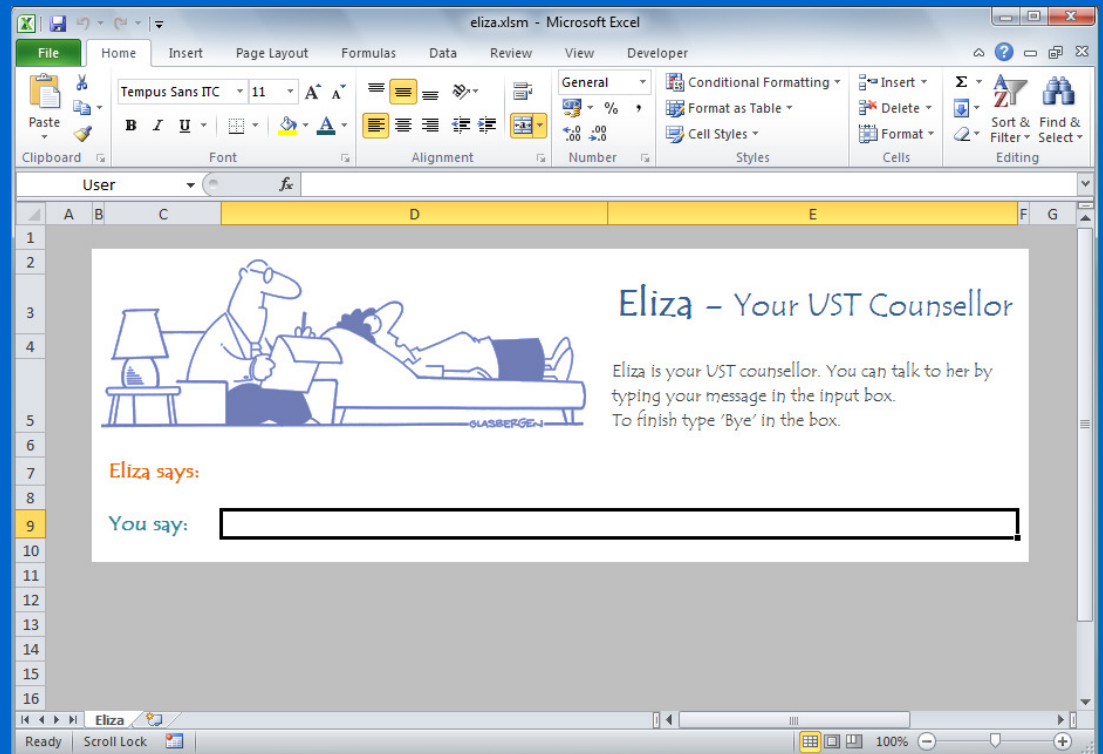
Assignment 2

Eliza – Your UST Counsellor

David Rossiter and Gibson Lam

Lab 4 Work

- In lab 4 you made Eliza, a virtual psychologist, using VBA programming
- In this assignment you need to extend the work that you have done in lab 4
- You talk to Eliza by typing something in a cell
- Eliza responds appropriately by showing the result in the worksheet, and speaking the result



The Logic of Eliza's Response

- In the lab you used the following logic to construct Eliza's response:

If the input text has...	"father" anywhere in the text	then Eliza will say...	"How did your father make you feel?"
	"mother" anywhere in the text		"What was your relationship with your mother like?"
	"computer" anywhere in the text		"Does it seem strange to talk to a computer?"
	"Hello" at the start of the text		"Hello, how do you feel today?"
	"You " at the start of the text		"We should be discussing you, not me."
	"I feel " at the start of the text		"I see. Tell me more about these feelings."
	"?" at the end of the text		"Why do you want to know?"
	"Bye" as the text content		"Nice to talk to you. Bye!"
	anything other than the above		"Please tell me more."

Overview of The Assignment

- You need to extend the lab work to do the following:
 - Extend the *If* statement of Eliza's response
 - Calculate and display an **emotion rating** for each message the user enters
 - Graphically track the emotion rating of the user over time for all the messages the user has entered
- There are many slides in this assignment description but most of them are just explanations that help you with this assignment
- A starting Excel file is also given to you, so all you need to do is to fill in the missing pieces which are all explained in the slides

An Example Display

- Here is an example display of the finished assignment:

The screenshot shows a software application window titled "Eliza - Your VST Counsellor". The interface is designed to look like a web browser or a simple desktop application. At the top, there's a header area with a cartoon illustration of a therapist (Eliza) sitting at a desk with a lamp, and a client lying on a couch. To the right of the illustration, the title "Eliza - Your VST Counsellor" is displayed. Below the title, a paragraph explains the application: "Eliza is your VST counsellor. You can talk to her by typing your message in the input box. To finish type 'Bye' in the box." Below this text, there's a section labeled "Eliza says:" followed by the response "Please tell me more." Below that, a section labeled "You say:" is followed by a text input box containing the user's message "I am very happy". Below the input box, there's a section titled "Emotion Tracker" which displays a line graph. The graph has a vertical axis representing emotion intensity, with a color gradient from red at the bottom to green at the top. The line graph shows several peaks and valleys, indicating fluctuations in emotion. To the right of the graph, the text "Emotion rating of the last message:" is followed by a green box containing the value "1.00". At the bottom of the application window, there's a navigation bar with several tabs: "Eliza", "Positive Word List", "Negative Word List", and "Emotion Ratings". The "Eliza" tab is currently selected. The bottom of the screenshot shows the Windows taskbar with the "Ready" status and a 100% zoom level.

Eliza - Your VST Counsellor

Eliza is your VST counsellor. You can talk to her by typing your message in the input box. To finish type 'Bye' in the box.

Eliza says: Please tell me more.

You say: I am very happy

Emotion Tracker

Emotion rating of the last message: 1.00

Eliza Positive Word List Negative Word List Emotion Ratings

Ready 100%

How to Extend Eliza's If Statement

- In your lab work you created a big *If* statement to decide the response from Eliza
- This was included in the change event handler of the Eliza worksheet
- In the assignment you need to:
 1. take the assignment starting Excel file
 2. copy the VBA code from your lab work into the starting Excel file at the appropriate place
 3. add a couple of new conditions to the *If* statement in the starting file, i.e. you need to insert two *ElseIf* statements before the *Else* statement (one *ElseIf* statement for “comp1022q” and one *ElseIf* statement for your instructor) – see next slide

Extending Eliza's If Statement

- You need to extend Eliza's *If* statement like this:
- All students:
 - If the input text has “comp1022q” anywhere in the text Eliza will say something appropriate/funny (not “Please tell me more.”)
- If you are in Prof. Rossiter's section:
 - If the input text has “rossiter” anywhere in the text Eliza will say something appropriate/funny (not “Please tell me more.”)
- If you are in one of Prof. Papadopoulos' sections:
 - If the input text has “papadopoulos” anywhere in the text Eliza will say something appropriate/funny (not “Please tell me more.”)

Emotion Rating

- You will calculate an *emotion rating* of each message input by the user
- The emotion rating in the assignment is defined to be:

$$\text{Emotion rating} = \frac{\text{no. of positive words}}{(\text{no. of positive words} + \text{no. of negative words})}$$

- Positive words are words that show positive feeling whereas negative words show negative feeling
- The range of the emotion rating is from 0 to 1, i.e. a rating of the message from negative to positive

Emotion Rating - Word Lists

- In the assignment you are given the positive/negative word lists in two separate worksheets:

	A	B	C	D	E
1	absorbed				
2	accepting				
3	admiration				
4	affected				
5	affectionate				
6	alive				
7	amazed				
8	animated				
9	attracted				
10	blessed				

Eliza Positive Word List Negative Word List

Ready

	A	B	C	D	E
1	abominable				
2	aching				
3	afflicted				
4	afraid				
5	aggressive				
6	agonized				
7	alarmed				
8	alienated				
9	alone				
10	angry				

Eliza Positive Word List Negative Word List

Ready

- Your VBA code searches for positive/negative words using the word lists in these two worksheets

Emotion Rating – Positive Words

- Positive words are words that show positive feeling
- Here are some example positive words:

Admiration

Brave

Easy

Jubilant

Amazed

Cheerful

Happy

Warm

- They are in the ‘Positive Word List’ worksheet in the starting Excel file

Emotion Rating – Negative Words

- Negative words are words that show negative feeling
- Here are some example negative words:

Afraid

Despair

Helpless

Upset

Alone

Dull

Loss

Worried


- They are in the ‘Negative Word List’ worksheet in the starting Excel file

Emotion Rating – Example 1

- Let's see an example calculation of the emotion rating:

“I feel **lonely** today”

There is one
negative word
in this message




- Emotion rating = $\frac{0 \text{ positive words}}{(0 \text{ positive words} + 1 \text{ negative word})}$
= $0 / 1$
= 0
- A very negative message!

Emotion Rating – Example 2


- Another example calculation of the emotion rating:

“I am **surprised** that you are **angry** and **sad**”

There is one positive word in this message



There are two negative words in this message



- Emotion rating = 1 positive word /
(1 positive word + 2 negative words)
= 1 / 3
= 0.33
- A slightly negative message!

Emotion Rating – Example 3

- A third example calculation of the emotion rating:

“How are you?”



No positive or
negative words
in this message!

- Emotion rating = 0 positive words /
(0 positive words + 0 negative words)
= 0 / 0 (cannot be calculated)
- If there are no positive/negative words we force the
rating to be 0.5 (a neutral message)

Emotion Rating – Example 4

- A fourth example calculation of the emotion rating:

“I was so **upset** and **unhappy** about your **pathetic**
attempt to make me **embarrassed**”

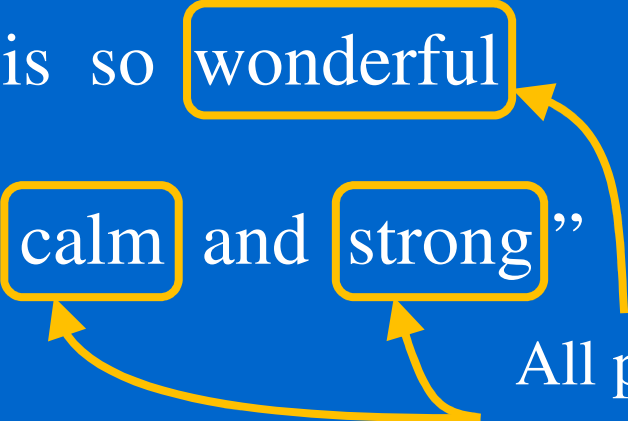
All negative words

- Emotion rating = 0 positive words /
(0 positive words + 4 negative words)
= 0 / 4
= 0
- A very negative message!

Emotion Rating – Example 5

- A fifth example calculation of the emotion rating:

“Your medicine is so wonderful
it makes me feel calm and strong”



All positive words

- Emotion rating = 3 positive words /
(3 positive words + 0 negative words)
= 3 / 3
= 1
- A very positive message!

Calculating the Emotion Rating

- In the assignment you need to calculate the emotion rating of a message using a VBA function
- The VBA function looks like this:

```
Function CalcEmotionRating( _  
    ByVal InputMsg As String) As Double  
    . . .  
End Function
```



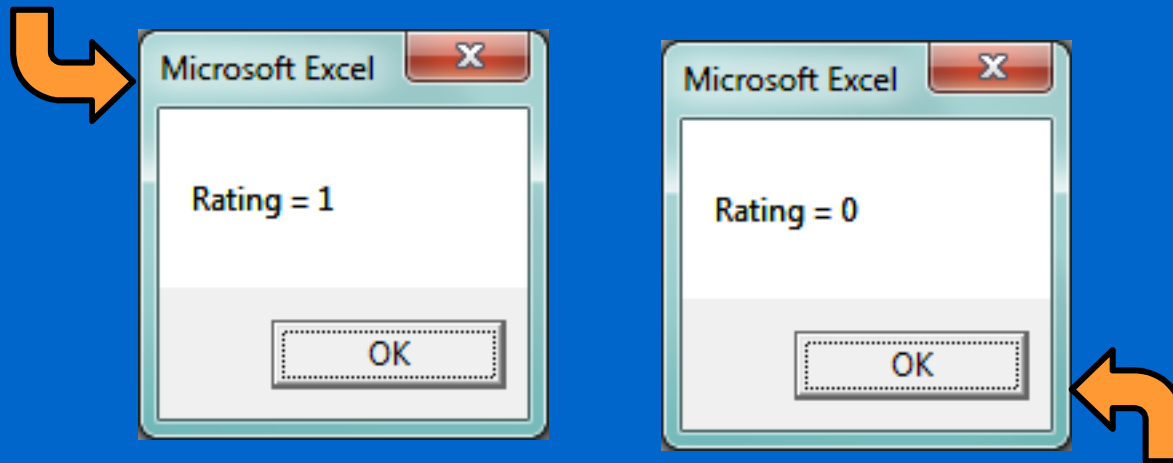
The input parameter
of the function

- This function shell has been given to you in the assignment starting Excel file

Using the CalcEmotionRating() Function

- Your *CalcEmotionRating()* function is used to calculate the emotion rating given an input string
- After finishing the function you can use it to display the emotion rating of any string, like this:

```
MsgBox "Rating = " & CalcEmotionRating("I am very happy")
```



```
MsgBox "Rating = " & CalcEmotionRating("I feel lonely today")
```

- Just to clarify the above code is useful for debugging but in the assignment you don't need to use a message box when an emotion rating is calculated

Using the CalcEmotionRating() Function

- In the assignment you use the function to get the emotion rating of the input text and display the returned value in the worksheet:

You say:

I am bad



0.00



`CalcEmotionRating(Range("User"))`

You say:

I am relaxed



1.00



`CalcEmotionRating(Range("User"))`

You say:

Who are you?



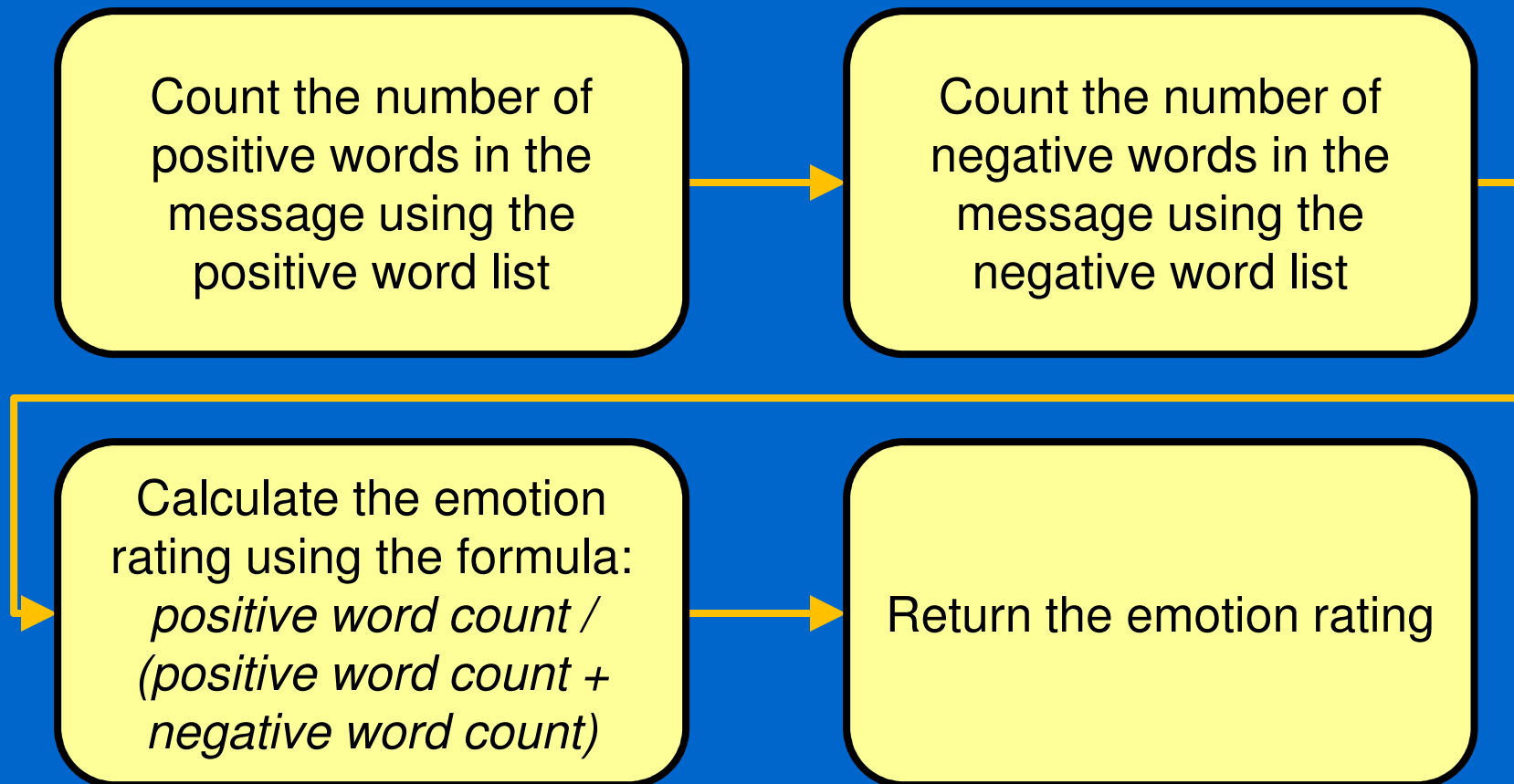
0.50



`CalcEmotionRating(Range("User"))`

The CalcEmotionRating() Function

- Here is the program flow of the *CalcEmotionRating()* function:



How to Count from the Word List?

- Here is the high level description of the code (not the real VBA code) to count the number of words in one of the word lists:

WordCount = 0

Row = 1

While Cells(Row, 1) is not empty

If the word in Cells(Row, 1) is within the input string then

WordCount = *WordCount* + 1

End If

$$Row = Row + 1$$

End While

- You can find examples of while loops in the Looping lecture notes

	A	B	C
1	absorbed		
2	accepting		
3	admiration		
	...		
110	unique		
111	warm		
112	wonderful		
113			

Ready

Eliza Positive Word List

- The loop stops at this cell because it is empty

Finding a Word within a String

- As you did in the lab you can use the *InStr()* function to find a word within a string
- However, you need to be careful using the *InStr()* function
- For example, an input message is shown on the right
 - *InStr()* returns a positive result if you search for “happy” within the message
 - However, in this example, “happy” is part of the negative word “unhappy” so you will get a wrong emotion rating if your program thinks that “happy” is one of the words in the message

Positive word?


“I am unhappy”

Negative word?

Searching for a Whole Word

- How to make sure that you are searching for a complete word instead of part of a word?
 - You can do so by adding spaces at the front and the end of a word before searching, i.e. search for

instead of



"happy"

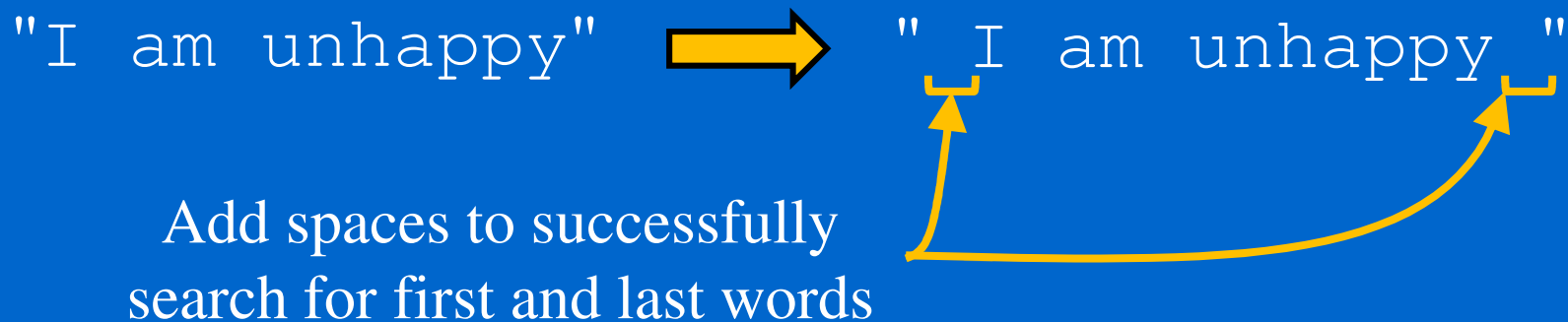
Starting and ending spaces

Searching in the Input Message

- If you add spaces before and after the search word you will have to do the same for the input message as well, i.e.

"I am unhappy" → " I am unhappy "

Add spaces to successfully search for first and last words


The diagram illustrates the process of adding spaces to a search string and a message string. On the left, the search string is "I am unhappy". A thick yellow arrow points to the right, where the message string " I am unhappy " is shown. The message string has a space at the beginning and a space at the end. Two yellow arrows point from the text "Add spaces to successfully search for first and last words" to the leading and trailing spaces in the message string. A curved yellow arrow also points from the search string to the message string, indicating the transformation.

- This makes sure that the words at the start and the end of the message can be searched correctly
- In VBA, the result of this code: " " & "message"
is: " message"

Handling Punctuation Marks

- When the input message contains punctuation marks (such as commas and fullstops) our search method will fail, for example:

" Are you happy? "



It will fail to search for “ happy ” when there is a punctuation mark such as a question mark next to the word

- You don't have to worry about this - in the assignment we assume that **NO** punctuation marks are entered next to the positive/negative words in the input message

Small/Big Letters

- Since the words in the input message can have different letter cases it would be better to search for a word regardless of the letter cases, i.e. small letters and big letters must be considered to be the same
- To do that you can change the input string to lower case using *LCase()* before searching for positive and negative words

Use LCase()

"I am UNHAPPY"  "i am unhappy"

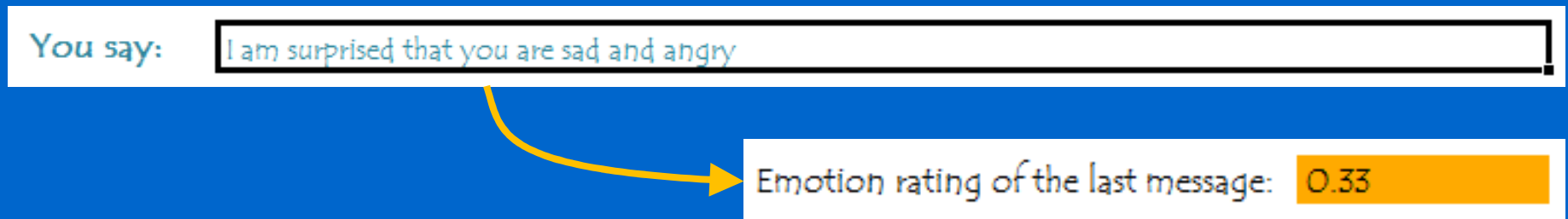
- However, please make sure you change the input string to lower case in your code only, i.e. in a variable

Starting Code for Word Counting

- In the starting Excel file, we have provided you with the VBA code for counting positive words from the word list
- You just need to duplicate the relevant code and make some minor changes for it to count negative words instead of positive words
- At the end, you should have one loop for counting positive words and one loop for counting negative words
- However, the given code does NOT search for whole words properly
- You need to make some adjustments to it so that it can search for whole words properly as described in the previous slides

Showing the Emotion Rating

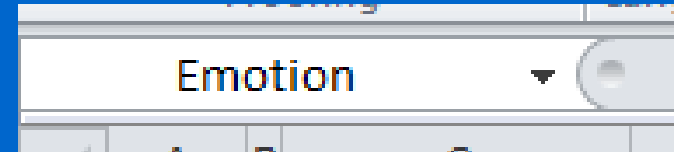
- After entering a new message the emotion rating has to be displayed appropriately in a cell
- Here is an example display:



- You need to show the emotion rating as a number
- In addition you need to have a different cell background colour depending on the value of the rating

Showing the Emotion Rating Using Named Cell

- One way to show the emotion rating in the worksheet is by using a named cell
- For example, you can assign a name, such as 'Emotion', to the cell used to display the emotion rating
- Then when you want to change the value of the cell you can use the *Range* function like this:



`Range ("Emotion") = your new emotion rating`

You calculate the emotion rating of a new message using the *CalcEmotionRating()* function

- Be reminded that you can change the content of the worksheet only when the worksheet is unprotected in the lab

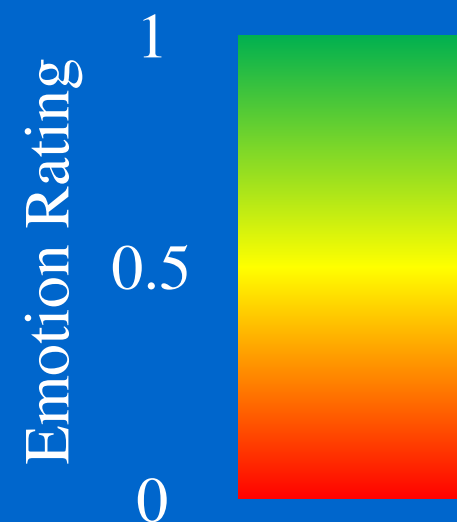
Emotion Rating Colour

- When the emotion rating is 0 the background colour of the cell is red
- When the emotion rating is 0.5 the background colour of the cell is yellow
- When the emotion rating is 1 the background colour of the cell is green
- Any other value is shown using a background colour in the middle of the above three colours
- This can be done using conditional formatting

Emotion rating of the last message: 0.00

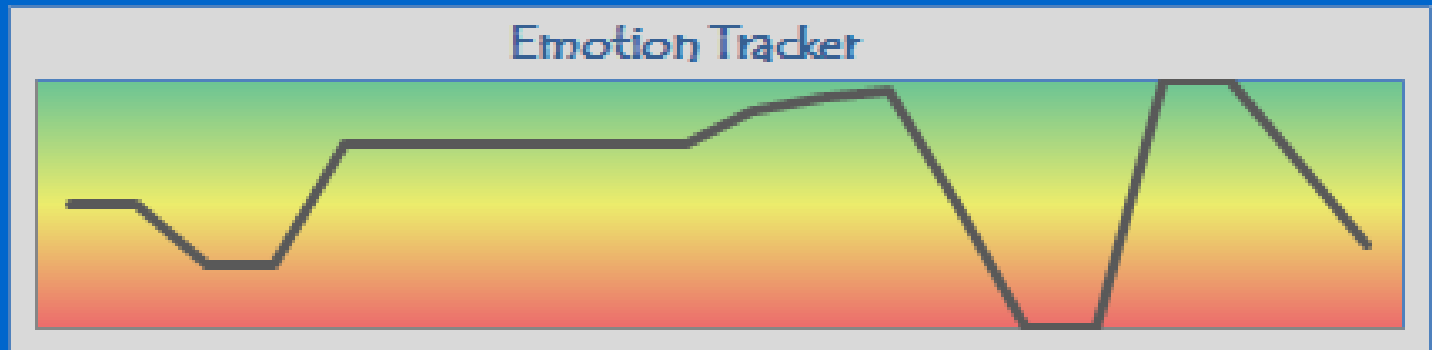
Emotion rating of the last message: 0.50

Emotion rating of the last message: 1.00

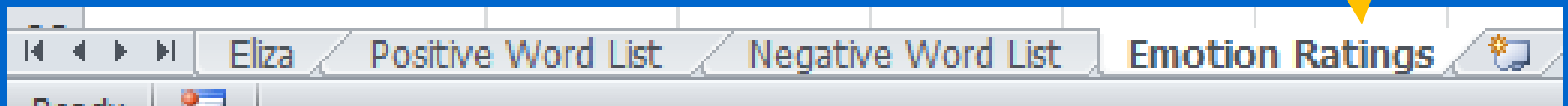


Emotion Tracker

- You need to graphically track the emotion rating of every message the user has entered
- You can use an Excel chart to do that, for example, like this:



- In order to create the chart you first need to keep a record of all emotion rating values in a separate worksheet

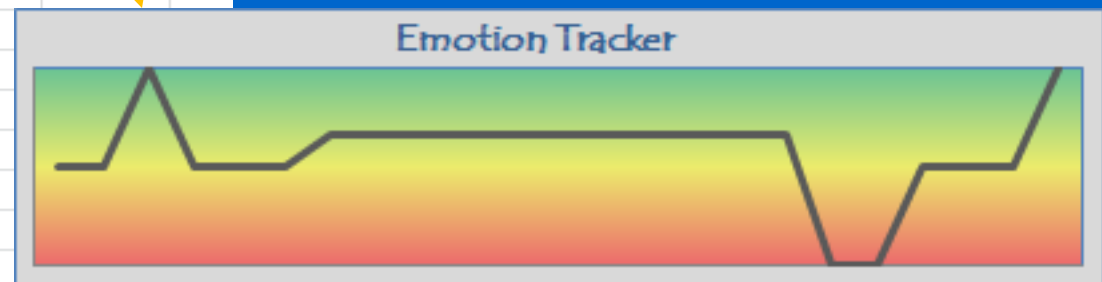


Emotion Ratings Excel Table

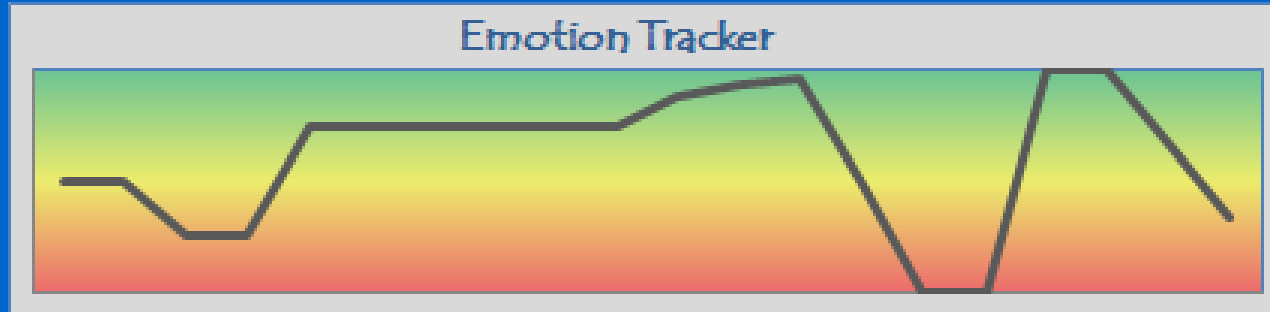
	A	B	C	D	E	F	G
1	Emotion Rating						
2	0.50						
3	0.50						
4	1.00						
5	0.50						
6	0.50						
7	0.50						
8	0.67						
9	0.67						
10	0.67						
11	0.67						
12	0.67						
13	0.67						
14	0.67						
15	0.67						
16	0.67						
17	0.67						
18	0.67						
19	0.00						
20	0.00						
21	0.50						
22	0.50						
23	0.50						
24	1.00						
25							

This set of data, in an Excel table, is shown in the Emotion Tracker chart

- The emotion rating values have to be stored as an Excel table
- When your table is extended (new rows are added) the chart will be automatically updated with the new data



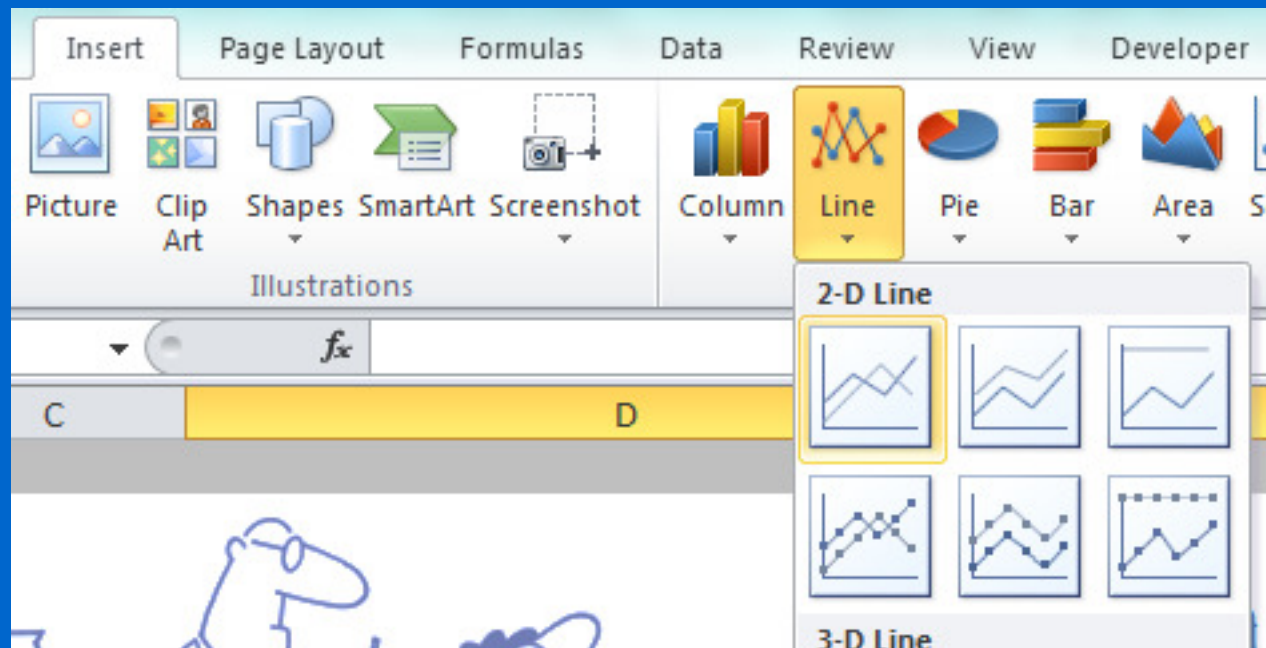
The Emotion Tracker Chart



- Your chart for tracking the emotion rating must:
 - be created in the ‘Eliza’ worksheet but it can be created beforehand, i.e. you don’t need to create it dynamically using VBA code, you can create it ‘manually’
 - have a fixed range [0, 1] in the y axis

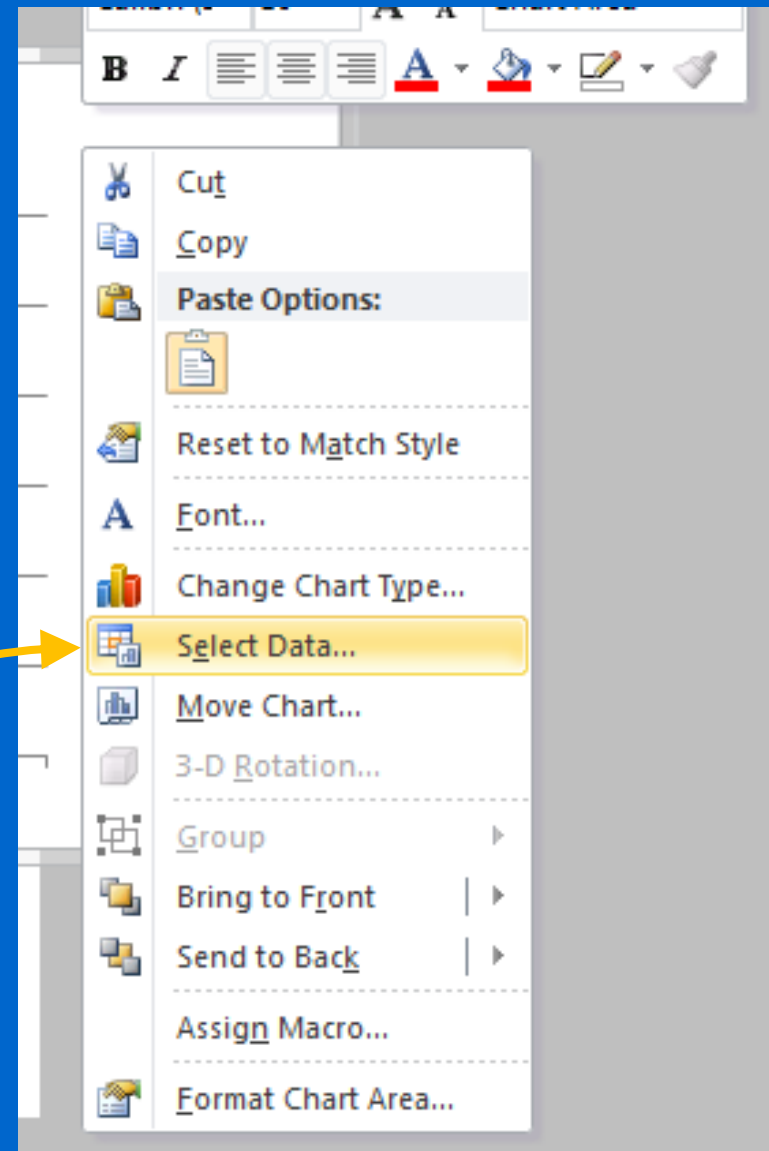
Creating the Emotion Tracker (1/6)

- To create the emotion tracker chart, first, you need to insert a chart into your Eliza worksheet using an appropriate type such as a 2-D Line chart, like this:



Creating the Emotion Tracker (2/6)

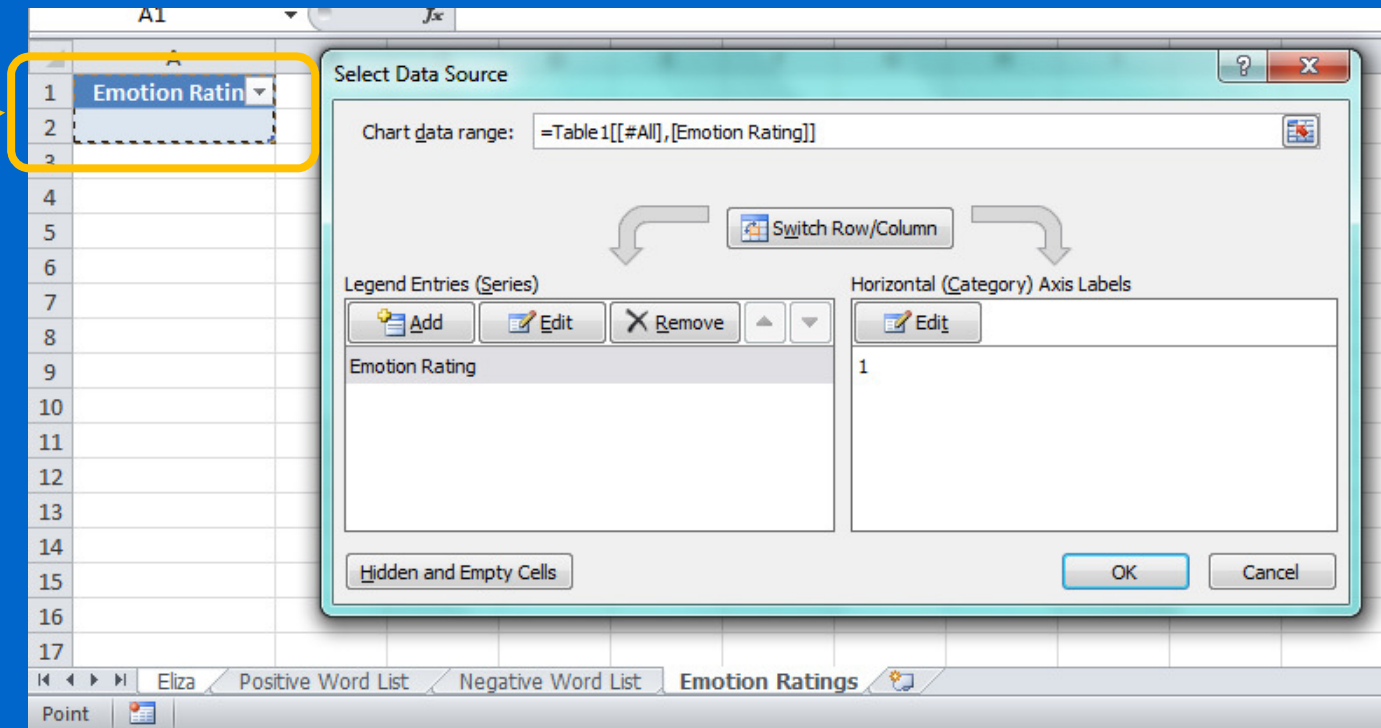
- After the chart is created you need to select the emotion rating table to be the source data of the chart
- To do this you right-click on the chart and then click on 'Select Data...'



Creating the Emotion Tracker (3/6)

- From the 'Select Data Source' window you select the emotion rating table by clicking and selecting the entire table using your mouse in the 'Emotion Ratings' worksheet

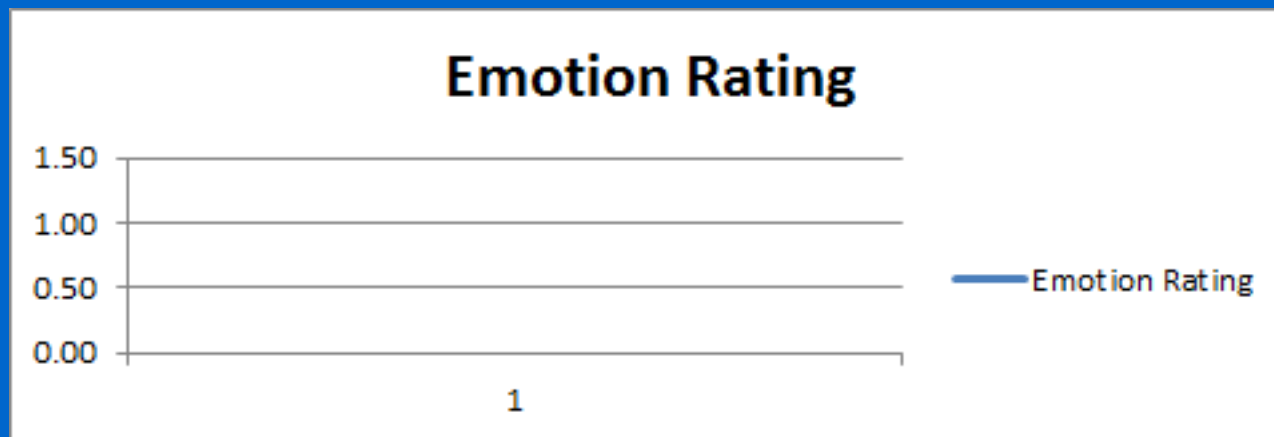
You can select the table as the chart data range



- This table has been given to you in the starting Excel file

Creating the Emotion Tracker (4/6)

- After you have used the emotion rating table as the data source your chart will look something like this:

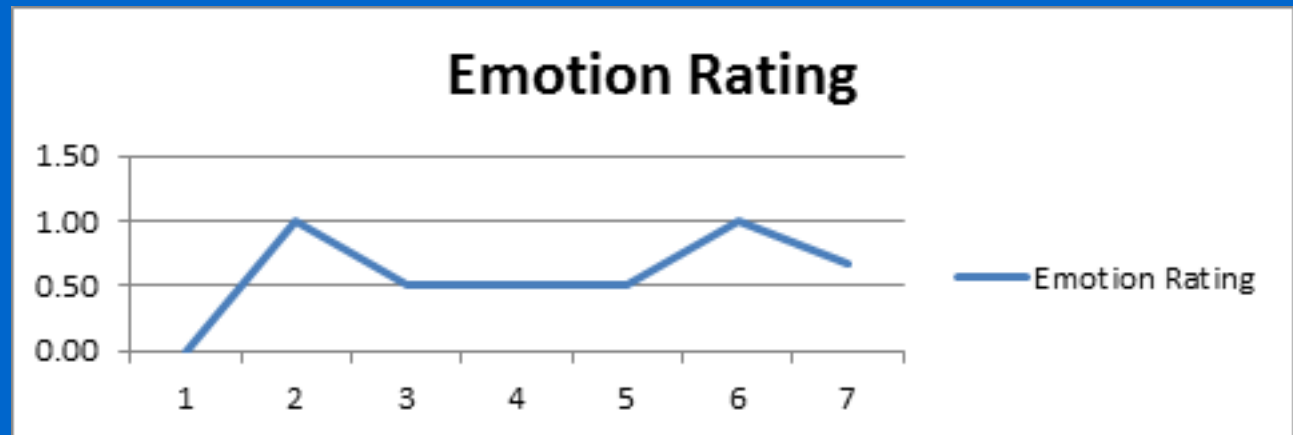


- Since at the start the emotion rating table does not have any data the chart is empty
- To prove that your chart is working properly you can try to manually insert values into the table

Creating the Emotion Tracker (5/6)

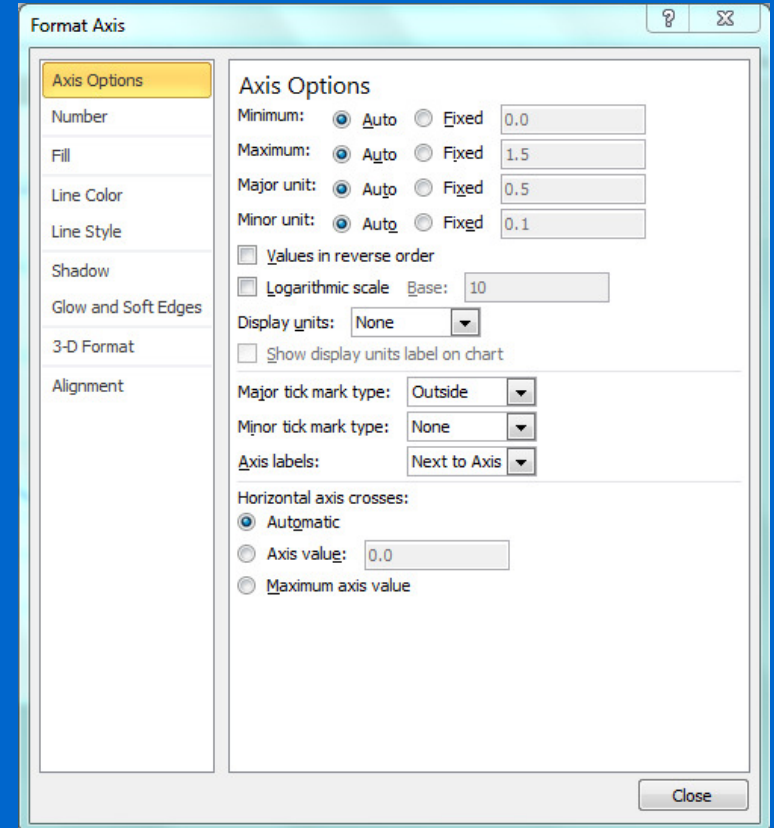
- For example, if the table is expanded to contain the data shown below your chart will update itself automatically

	A
1	Emotion Rating
2	0.00
3	1.00
4	0.50
5	0.50
6	0.50
7	1.00
8	0.66
9	



Creating the Emotion Tracker (6/6)

- You can customize your emotion tracker chart
- For example, you can specify the range of your y axis, which is part of the assignment requirement
- To do this you can right-click on the y axis, select 'Format Axis' and then change the settings of the axis accordingly



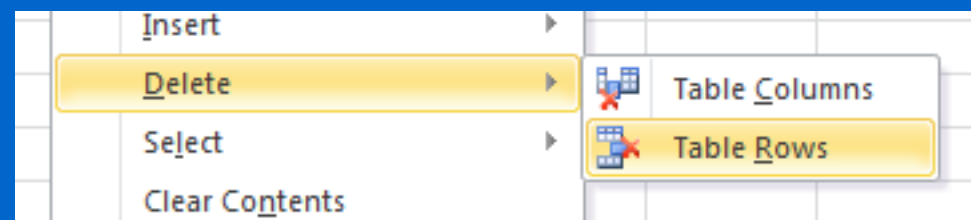
The Emotion Rating Table

- You need to be careful when managing the emotion ratings in the Excel table
- When you delete the emotion rating values from the Excel table you don't really want to accidentally delete the entire table
- This is because the emotion tracker chart has been linked with the Excel table so the chart will be messed up if the table is gone
- You can use these steps to safely delete all entries in your table:

1. Select all data rows in the table

	A
1	Emotion Rating
2	0.00
3	0.30
4	1.00
5	0.25
6	0.80
7	1.00
8	1.00
9	

2. Right-click on the table and select delete table rows



3. After that the table will still be in the same place with an empty data row

	A
1	Emotion Rating
2	
3	

Your Excel File

- Your work must be in one single Excel file
- The file must have four worksheets:

Eliza	Positive Word List	Negative Word List	Emotion Ratings
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1. A worksheet containing the Eliza program
2. A worksheet containing the positive word list
3. A worksheet containing the negative word list
4. A worksheet containing the emotion ratings of all messages entered so far

Submission

- You need to submit your Excel file using the CASS system before the deadline
- The CASS system is here:

`https://course.cse.ust.hk/cass`

- The deadline is **8pm, Wednesday 3 April 2013**
- **Check your work carefully** before you submit your file!
- **Submit your work early**, well before the deadline!

Penalty for Late Submission

- If you submit your assignment after the deadline it causes us a lot of time and trouble, so please don't do that. Our policy for lateness is:
 - 10 marks if you submit up to 1 hour late
(even if you are 0.01 second late!)
 - 5 marks for each further hour late, up to 12 hours
i.e. if you submit 90 minutes late the penalty will be -15 marks
 - Zero marks if you submit more than 12 hours late

Marking Scheme Summary

- 4 marks – Worksheets
- 24 marks – Basic Program
- 12 marks – Extended If statement of Eliza's Response
- 28 marks – The Emotion Rating Calculation
- 12 marks – The Emotion Rating Display
- 20 marks – Emotion Tracker

The maximum possible mark is 100

Marking Scheme – Worksheets

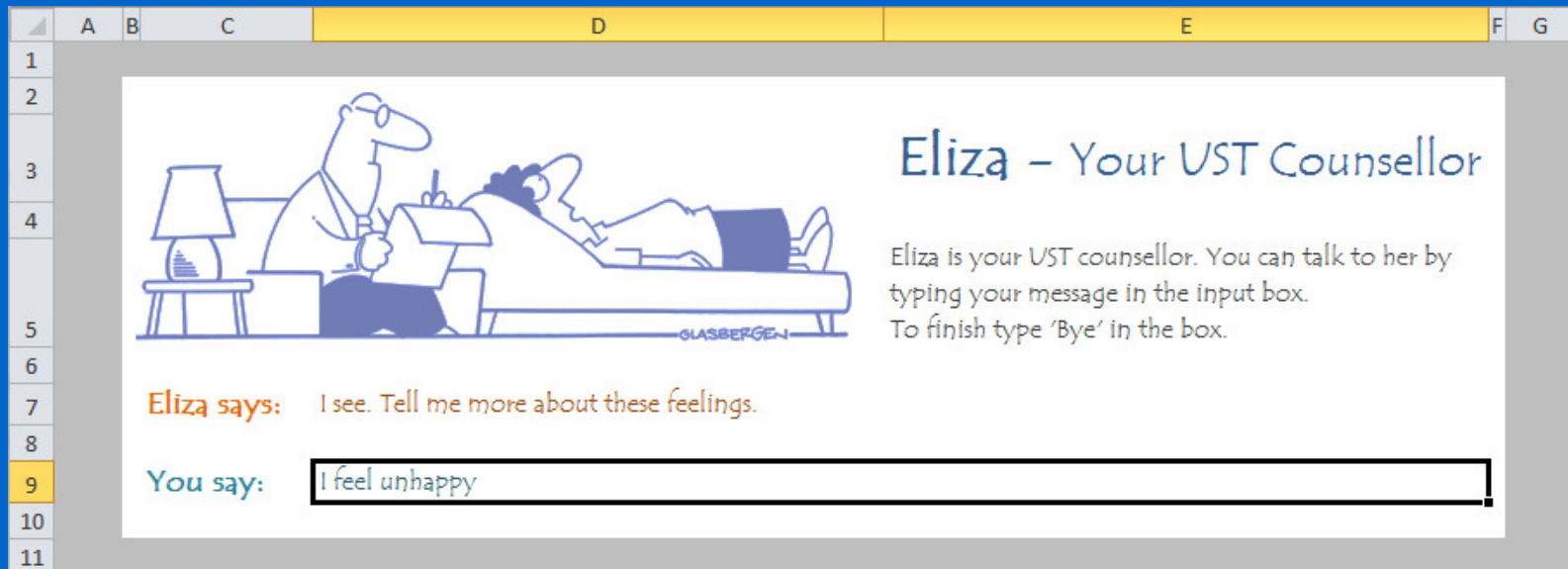
- Worksheets (4 marks)

Eliza	Positive Word List	Negative Word List	Emotion Ratings
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+4 marks – the Excel file has 4 worksheets, which must be given appropriate names and put in a sensible order (like above); no unnecessary worksheets are included in the Excel file; delete any worksheets that are not part of the assignment

Marking Scheme – Basic Program

- Basic Program (24 marks)



+24 marks – The basic features (i.e. the work you have done in the lab, as shown on the next page) must work appropriately

Marking Scheme – Basic Program

- Here are the basic features of the Eliza program, which you have done in lab 4:
 - The ‘Eliza’ worksheet is protected so that only the user input cell can be selected and changed
 - User enters some text, the system analyses the text, and then makes an appropriate response
 - The system shows its response in a cell and also speaks it out loud
 - The system gives particular responses according to one of the situations shown in page 3 of this assignment requirement (or in the lab page)

Marking Scheme – Extended If statement of Eliza's Response

Eliza says: I know it is a great course! What do you think?

You say:

- Extended If statement of Eliza's response (12 marks)
 - +6 marks – Eliza says something appropriate/funny (not 'Please tell me more.') when the input message contains the word "comp1022q"
 - +6 marks – Eliza says something appropriate/funny (not 'Please tell me more.') when the input message contains the surname of your instructor (the word you have to use depends on who your instructor is)

Marking Scheme – The Emotion Rating Calculation

- The emotion rating calculation (28 marks)
 - +4 marks – A *CalcEmotionRating* () function is used in the Eliza worksheet for the calculation of the emotion rating
 - +8 marks – The emotion rating is calculated correctly if one of the positive/negative words is at the start of the input message

Marking Scheme – The Emotion Rating Calculation

+8 marks – The emotion rating is calculated correctly if one of the positive/negative words is at the end of the input message

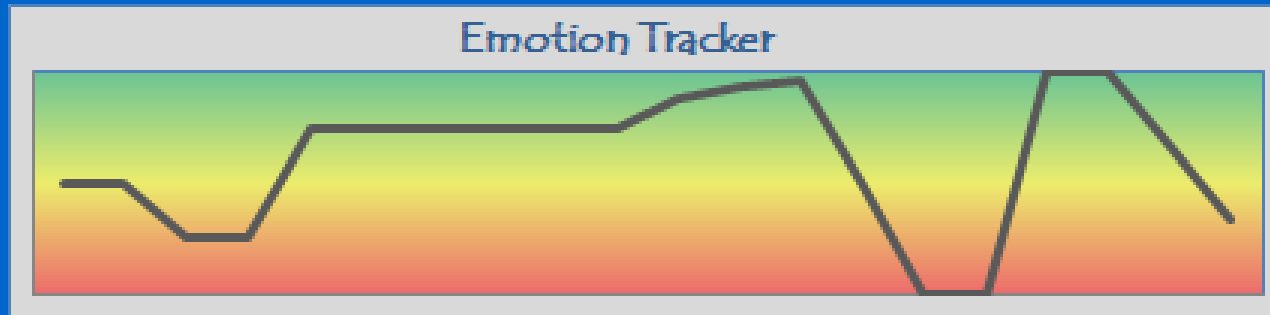
+8 marks – The emotion rating is calculated correctly even if one of the positive/negative words is part of another word (i.e. unhappy and happy)

Marking Scheme – The Emotion Rating Display

Emotion rating of the last message: 0.33

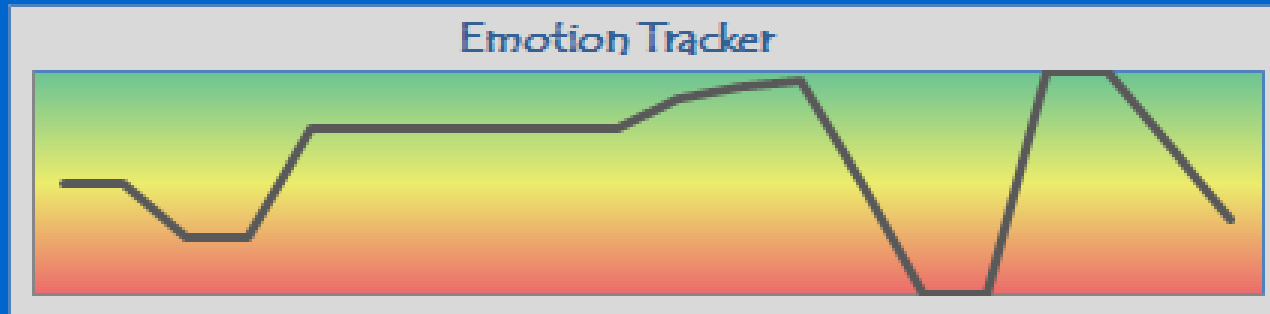
- The emotion rating display (12 marks)
 - +4 marks – A correct value of the emotion rating is displayed every time the user enters a new message
 - +4 marks – The background colour of the emotion rating changes appropriately according to the value of the cell
 - +4 marks – The background colour uses a colour between red, yellow and green when the emotion value is between 0, 0.5 to 1

Marking Scheme – Emotion Tracker



- Emotion Tracker (20 marks)
 - +4 marks – An emotion tracker (an Excel chart) is shown in the Eliza worksheet
 - +4 marks – The chart plots emotion rating values shown in a worksheet called “Emotion Ratings”
 - +4 marks – The range of the y axis is fixed at [0, 1] (the x axis is automatically handled by the chart)

Marking Scheme – Emotion Tracker



Emotion rating of the last message: 0.67

+4 marks – When a new message is entered the emotion rating of the new message is added at the end of the table in the “Emotion Ratings” worksheet

A
Emotion Rating
0.50
0.67

+4 marks – The emotion tracker chart is automatically updated with the newly added emotion rating