Excel part 1

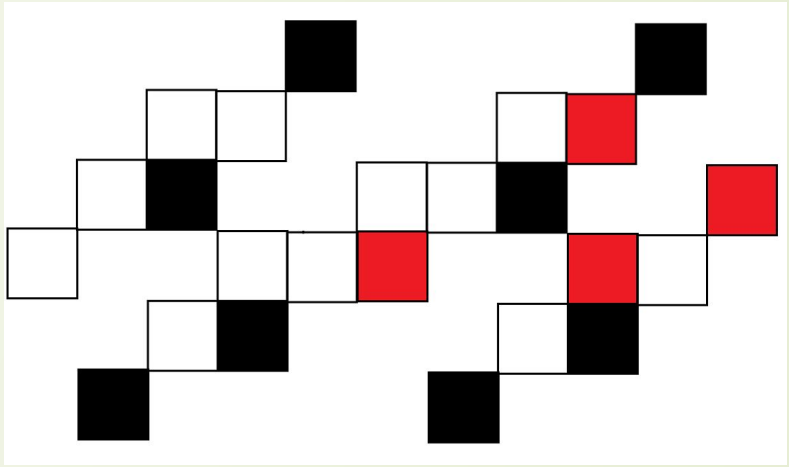
Hints and examples

Free eBook version 0.1

by Adam Higherstein

Kakelino's Cde School

Excel 1



Do graphs always tell the truth?
Examples: How we can give a wrong picture of the real situation?

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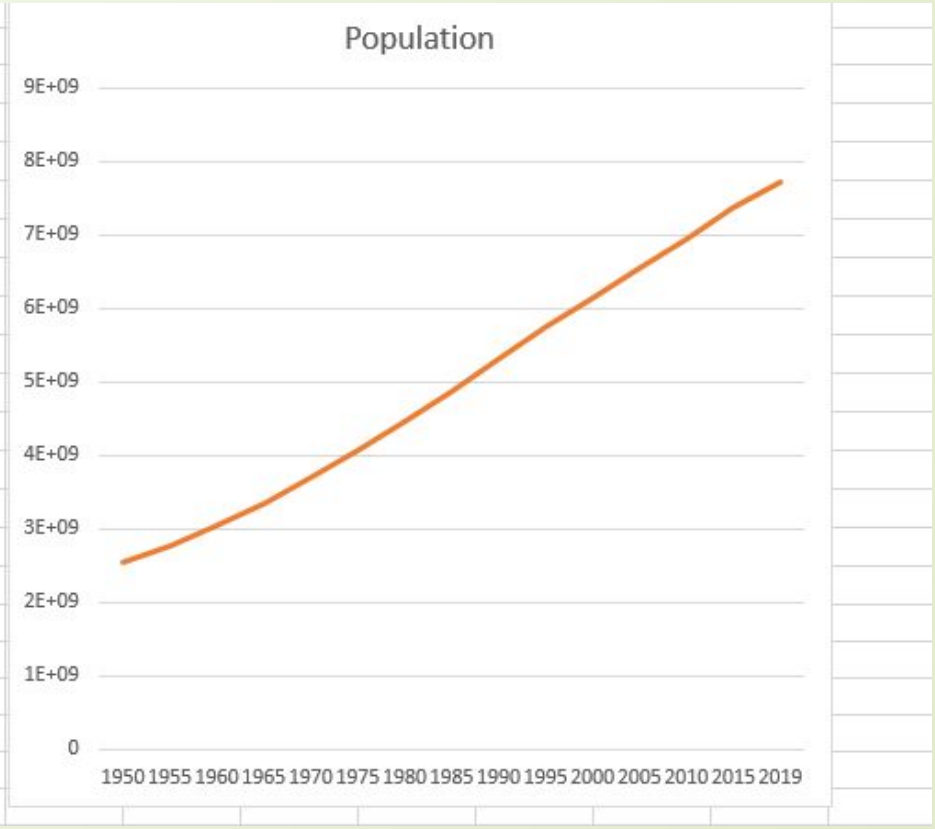
Excel 1
Line chart

Year	Population
1950	2536431140
1955	2773019936
1960	3034949748
1965	3339583597
1970	3700437046
1975	4079480606
1980	4458003514
1985	4870921740
1990	5327231061
1995	5744212979
2000	6143493823
2005	6541907027
2010	6956823603
2015	7379797139
2019	7713468100



Word population seems to grow fast!

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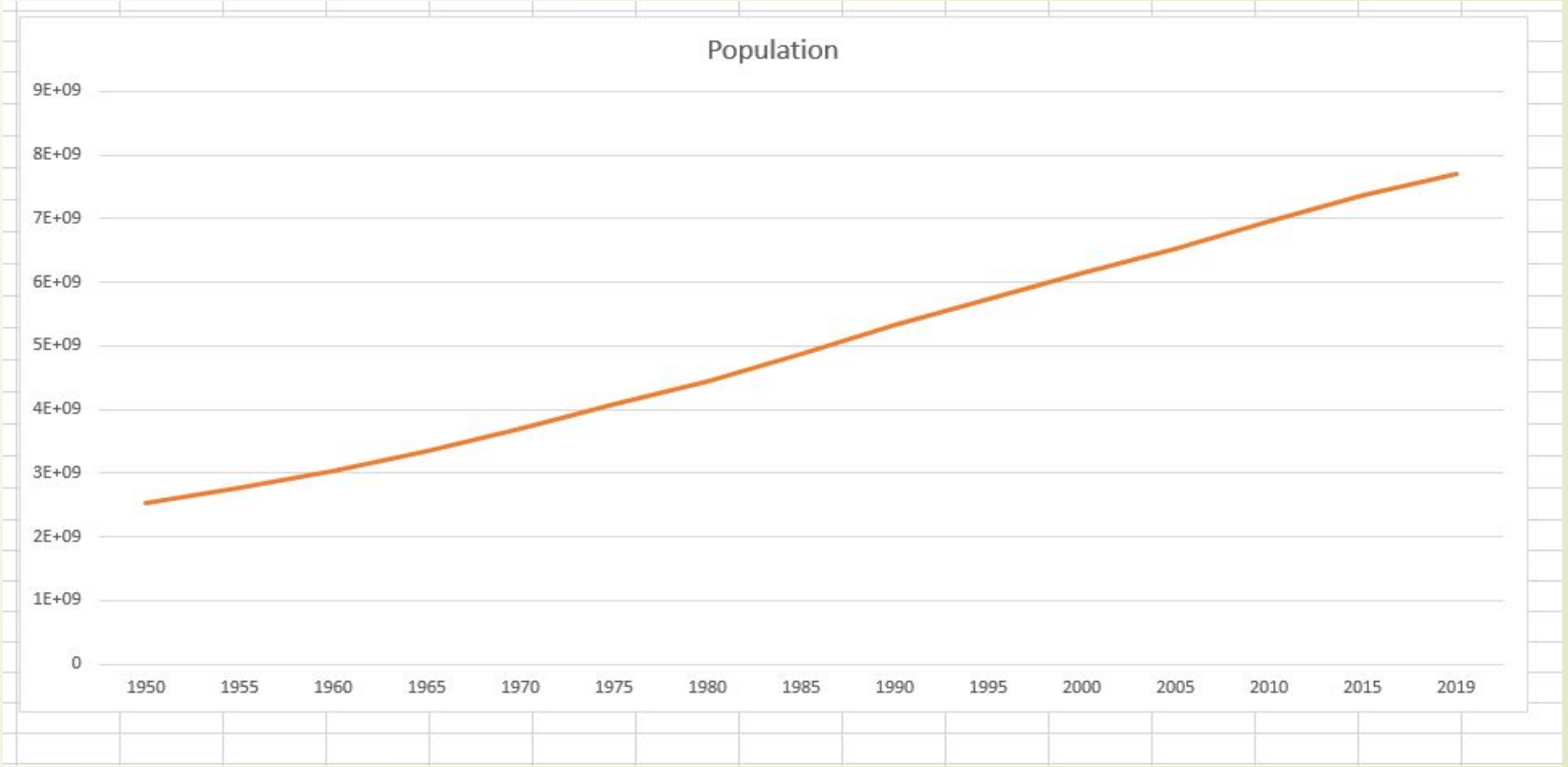
Excel 1
Line chart



Same values here, but now word population does not show to grow so very fast!

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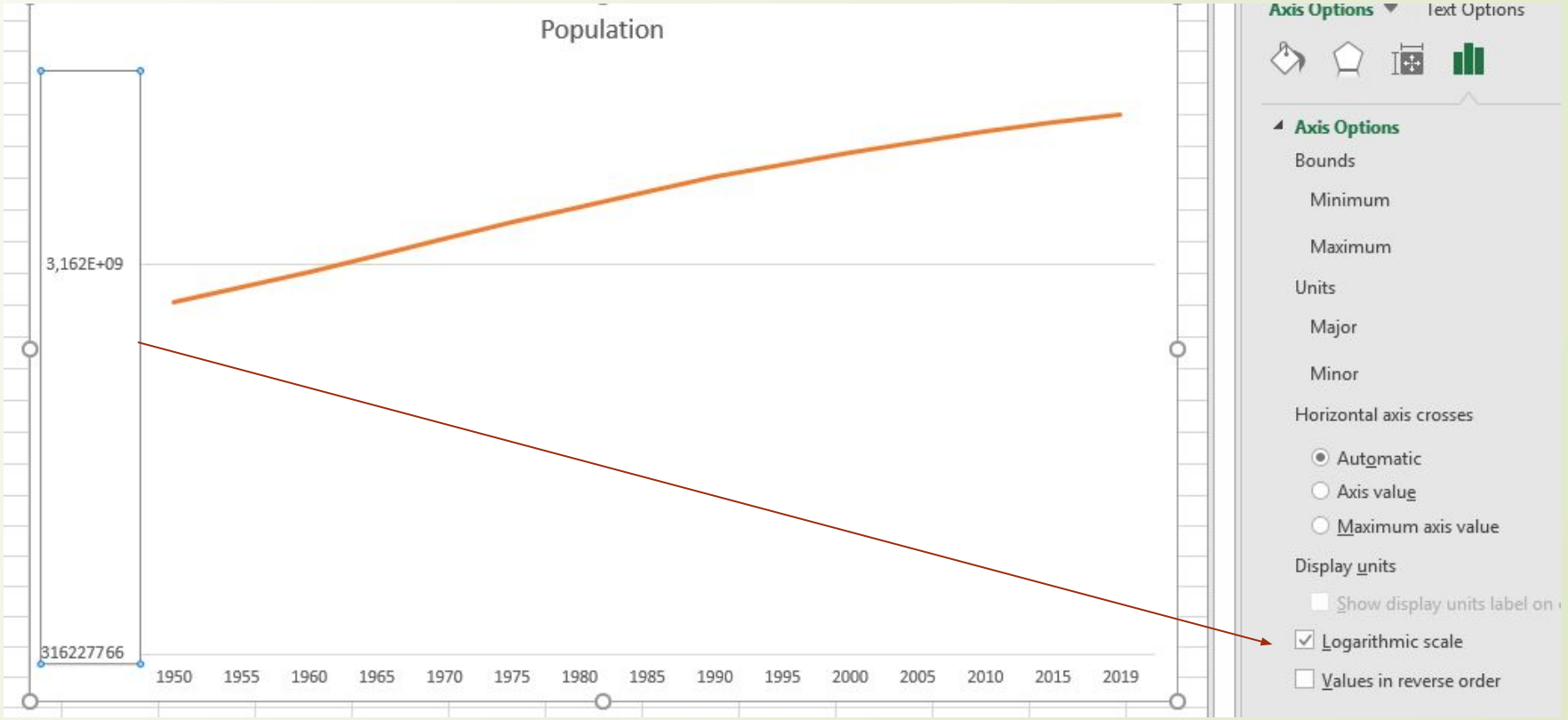
Excel 1
Line chart



Same values here, but
logaritmic y axis:
growth rate is slow?

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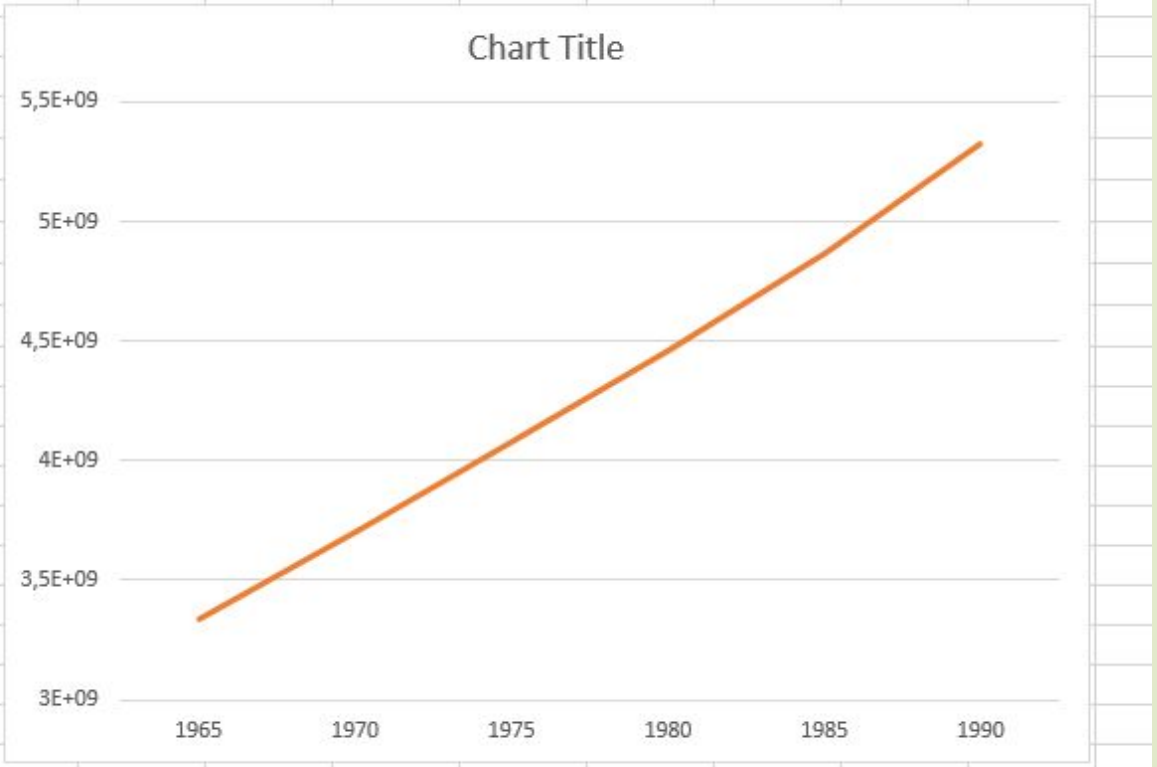
Excel 1
Line chart

If we cut off some value pairs and change minimum value of y, se can say that during those years growth was enormous!!

1965	3339583597
1970	3700437046
1975	4079480606
1980	4458003514
1985	4870921740
1990	5327231061



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Excel 1
Line chart

If we cut off some value pairs and change minimum value of y, se can say that during those years growth was enormous!!

1965	3339583597
1970	3700437046
1975	4079480606
1980	4458003514
1985	4870921740
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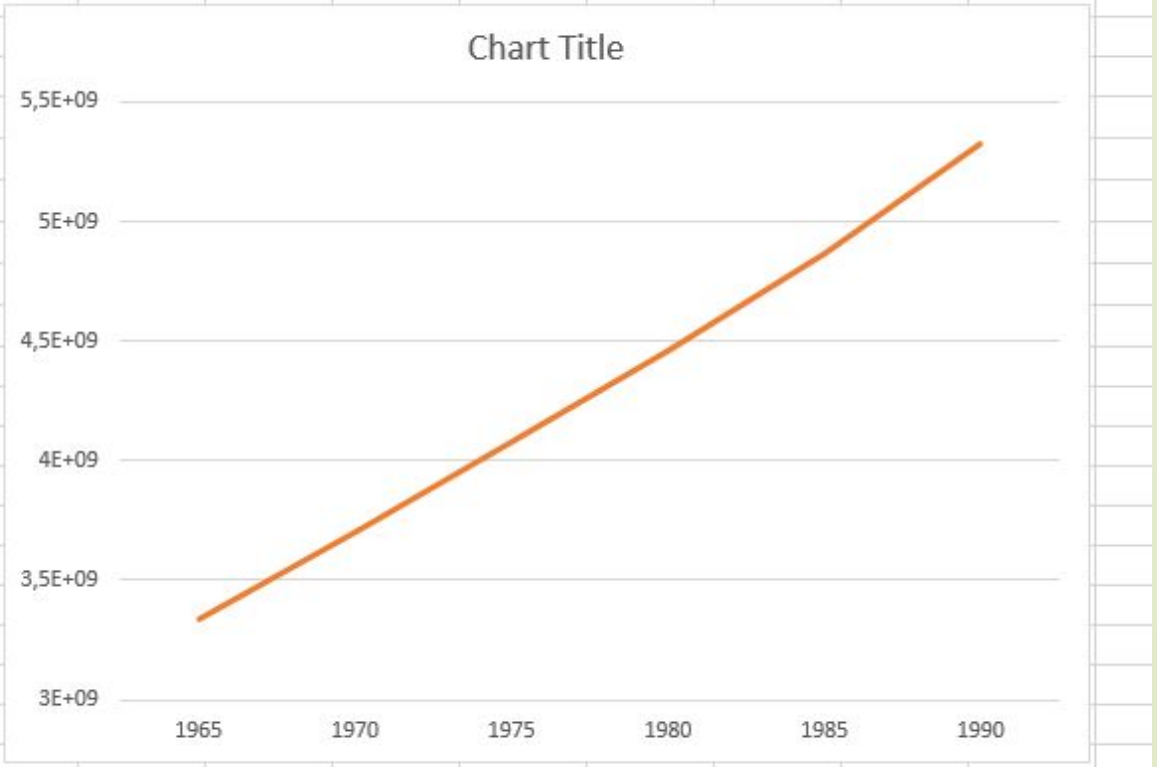

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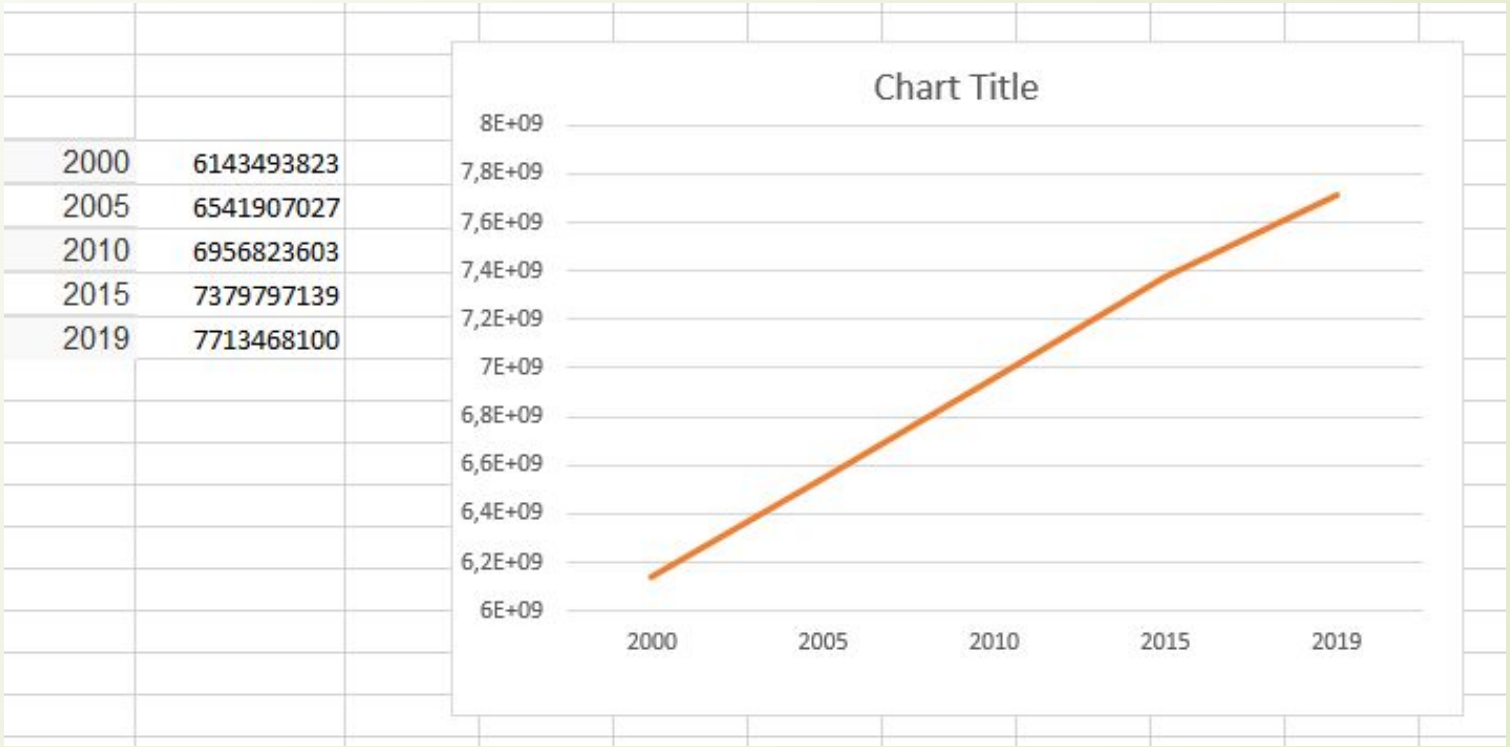
Excel 1
Line chart

BUT we can convince with this chatr tthat years between 2000 – 2020 show that we are too many soon!?!? Or can we?



http://worldpopulationreview.com/

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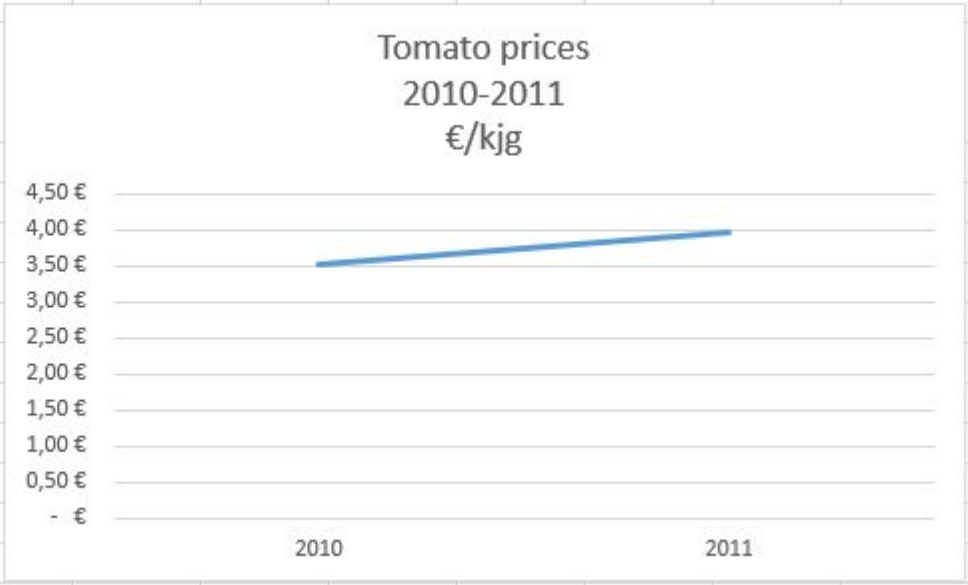
Excel 1
Line chart

What about here: we can say (by seeing the chart) that tomate price has not change rather much..

Year	Tomato price, €/kg
2010	3,52 €
2011	3,96 €



https://helda.helsinki.fi/

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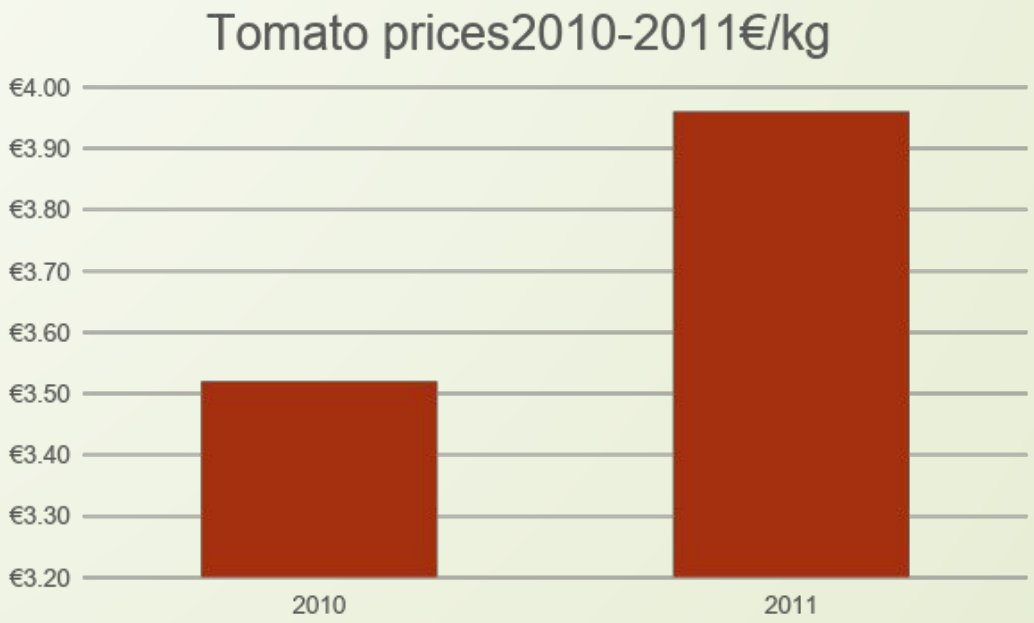
Excel 1
Line chart

But this chart shows clearly that price has changed quite a lot!



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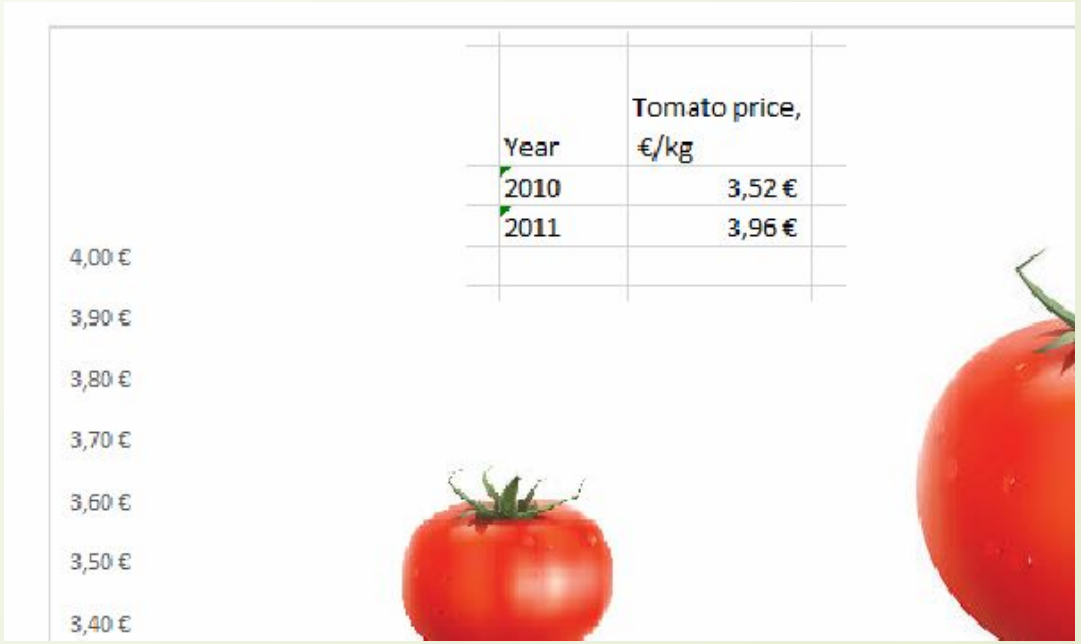
Excel 1
Line chart

AND if you want to illustrate price change, it is really easy cheat…



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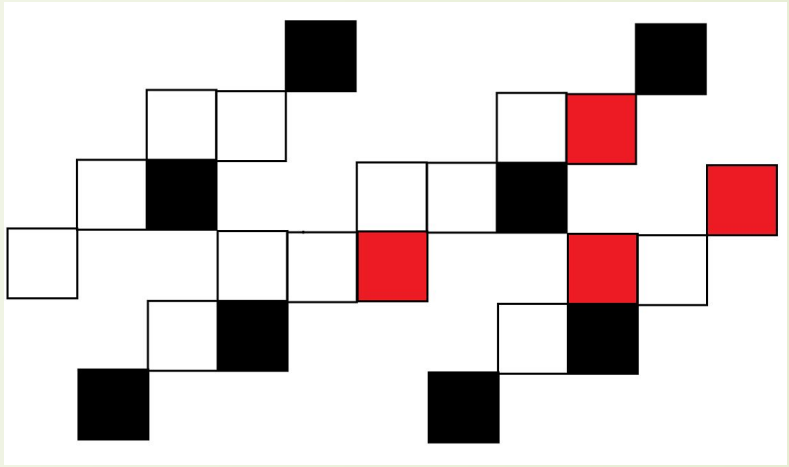
Excel 2



Using macros and User Form

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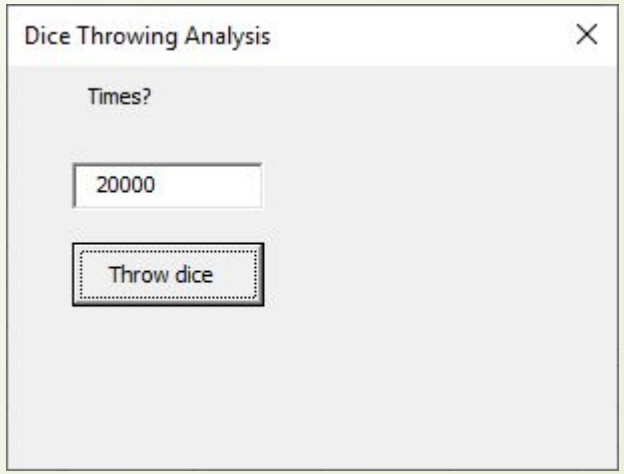
Excel 2

Macro & UserForm



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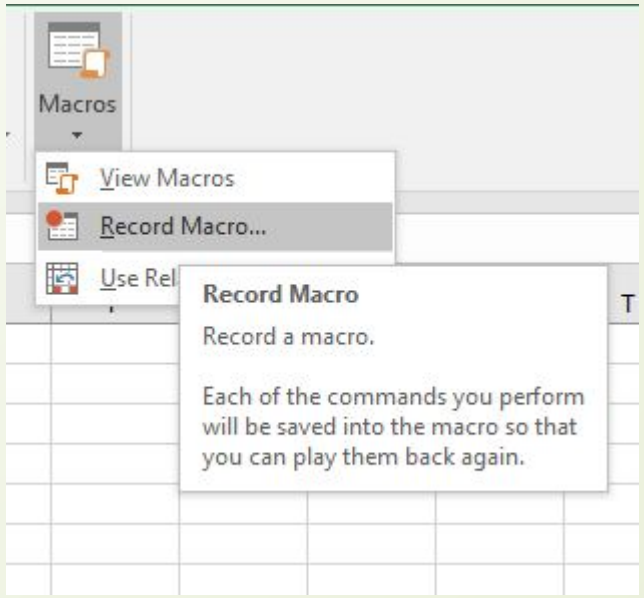
Excel 2

Macro & UserForm



Try first: recording a macro

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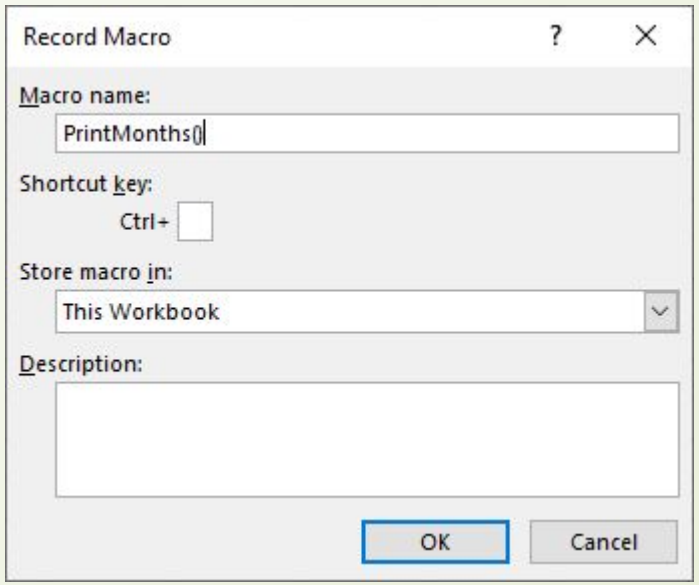
Excel 2

Macro & UserForm



Try first: recording a macro

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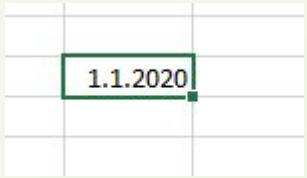
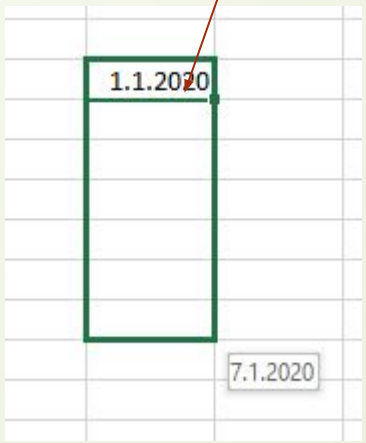
Excel 2

We create a month calendar and record steps to a macro





C	D
1.1.2020	
2.1.2020	
3.1.2020	
4.1.2020	
5.1.2020	
6.1.2020	
7.1.2020	
8.1.2020	
9.1.2020	
10.1.2020	
11.1.2020	
12.1.2020	
13.1.2020	
14.1.2020	
15.1.2020	
16.1.2020	
17.1.2020	
18.1.2020	
19.1.2020	
20.1.2020	
21.1.2020	
22.1.2020	
23.1.2020	
24.1.2020	
25.1.2020	
26.1.2020	
27.1.2020	
28.1.2020	
29.1.2020	
30.1.2020	
31.1.2020	

Macro & UserForm

Try first: recording a macro

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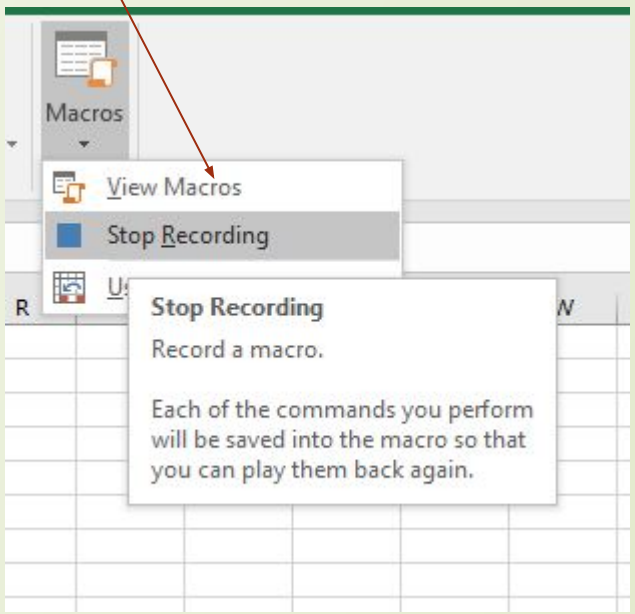
Excel 2

1.1.2020	1.2.2020	1.3.2020
2.1.2020	2.2.2020	2.3.2020
3.1.2020	3.2.2020	3.3.2020
4.1.2020	4.2.2020	4.3.2020
5.1.2020	5.2.2020	5.3.2020
6.1.2020	6.2.2020	6.3.2020
7.1.2020	7.2.2020	7.3.2020
8.1.2020	8.2.2020	8.3.2020
9.1.2020	9.2.2020	9.3.2020
10.1.2020	10.2.2020	10.3.2020
11.1.2020	11.2.2020	11.3.2020
12.1.2020	12.2.2020	12.3.2020
13.1.2020	13.2.2020	13.3.2020
14.1.2020	14.2.2020	14.3.2020
15.1.2020	15.2.2020	15.3.2020
16.1.2020	16.2.2020	16.3.2020
17.1.2020	17.2.2020	17.3.2020
18.1.2020	18.2.2020	18.3.2020
19.1.2020	19.2.2020	19.3.2020
20.1.2020	20.2.2020	20.3.2020
21.1.2020	21.2.2020	21.3.2020
22.1.2020	22.2.2020	22.3.2020
23.1.2020	23.2.2020	23.3.2020
24.1.2020	24.2.2020	24.3.2020
25.1.2020	25.2.2020	25.3.2020
26.1.2020	26.2.2020	26.3.2020
27.1.2020	27.2.2020	27.3.2020
28.1.2020	28.2.2020	28.3.2020
29.1.2020	29.2.2020	29.3.2020
30.1.2020		30.3.2020
31.1.2020		31.3.2020

Macro & UserForm

Try first: recording a macro
When calendar is ready,
stop recording



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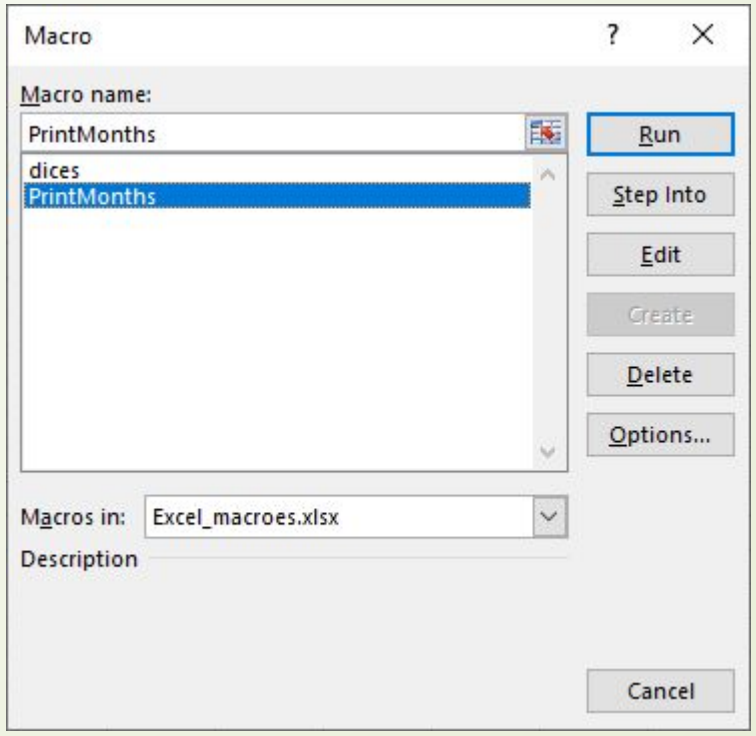
Excel 2



Macro & UserForm

Try first: recording a macro

Try to run that macro!

You get a month calendar in a second!

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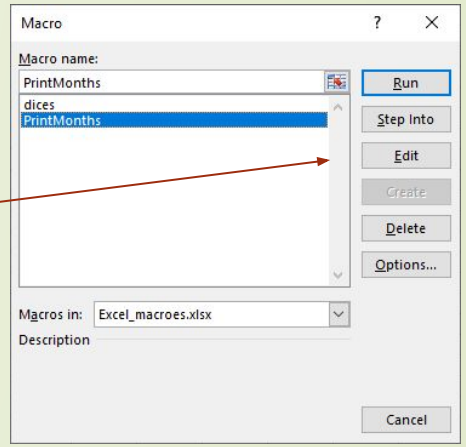
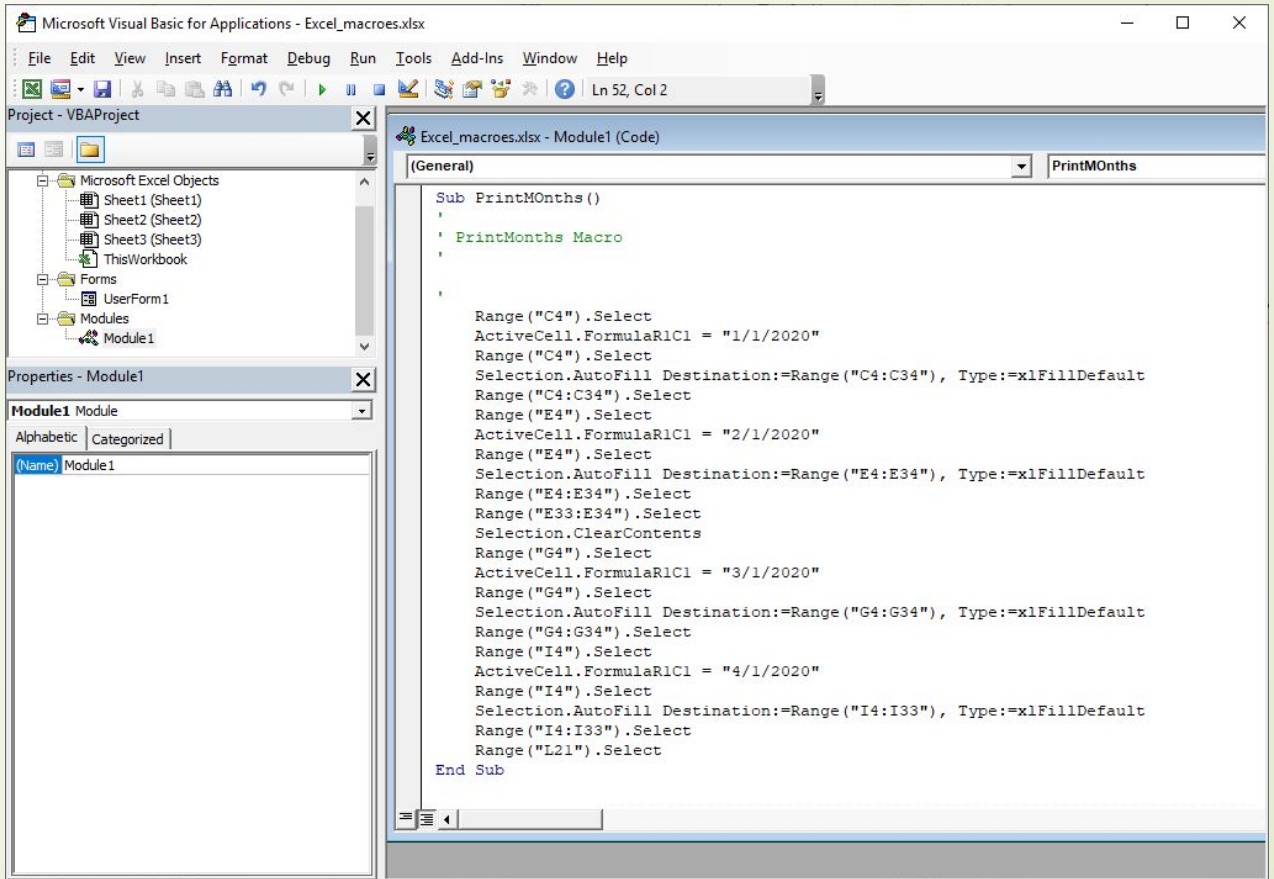
Macro & UserForm

Excel 2

Adding UserForm

VBA editor opens when you click edit => you can see the VBA code!





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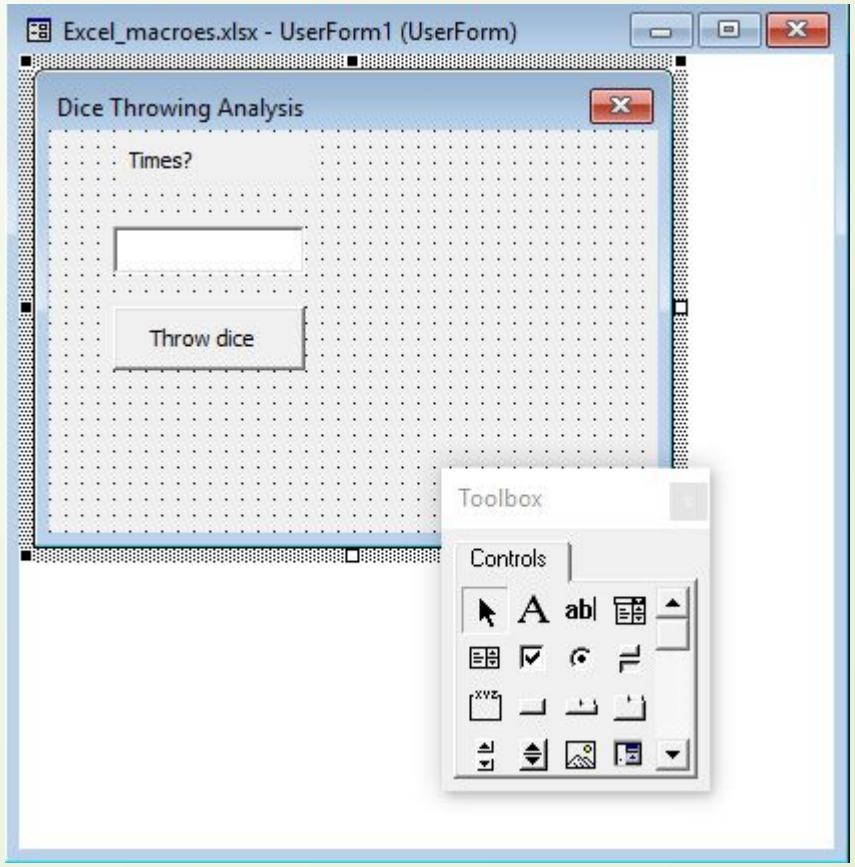
Macro & UserForm

Excel 2



Adding UserForm

VBA editor opens
You can insert a userform and add there controls!

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Macro & UserForm

Excel 2

Adding UserForm

You can write code to handle e.g. button event!

```
Private Sub CommandButton1_Click()
    Dim val As String
    val = TextBox1.Text
    Dim times As Long
     Dim dice As Integer
     times = val

     Dim n1, n2, n3, n4, n5, n6 As Integer

     Randomize
```

Now we are creating a dice throwing app: user gives amount of throws in a textbox. Amounts of each dice value are calculated!

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Macro & UserForm

Excel 2

Adding UserForm

You can write code
To handle button event

```
For k = 1 To times Step 1

    dice = Int((6 - 1 + 1) * Math.Rnd + 1)
    'Int((upperbound - lowerbound + 1) * Rnd + lowerbound)
    If dice = 1 Then
       n1 = n1 + 1
    End If
     If dice = 2 Then
       n2 = n2 + 1
    End If
     If dice = 3 Then
       n3 = n3 + 1
    End If
    If dice = 4 Then
       n4 = n4 + 1
    End If
   If dice = 5 Then
       n5 = n5 + 1
    End If
    If dice = 6 Then
       n6 = n6 + 1
  End If
Next
```

Now we are creating a dice throwing app: user gives amount of throws in a textbox. Amounts of each dice value are calculated!

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Macro & UserForm

Excel 2

Adding UserForm

You can write code
To handle button event

```
        Range("b1").Select
        ActiveCell.Value = n1
               Range("b2").Select
        ActiveCell.Value = n2
               Range("b3").Select
        ActiveCell.Value = n3
               Range("b4").Select
        ActiveCell.Value = n4
               Range("b5").Select
        ActiveCell.Value = n5
               Range("b6").Select
        ActiveCell.Value = n6


End Sub
```

Amounts of each dice value are calculated! Amounts are shown on cells.

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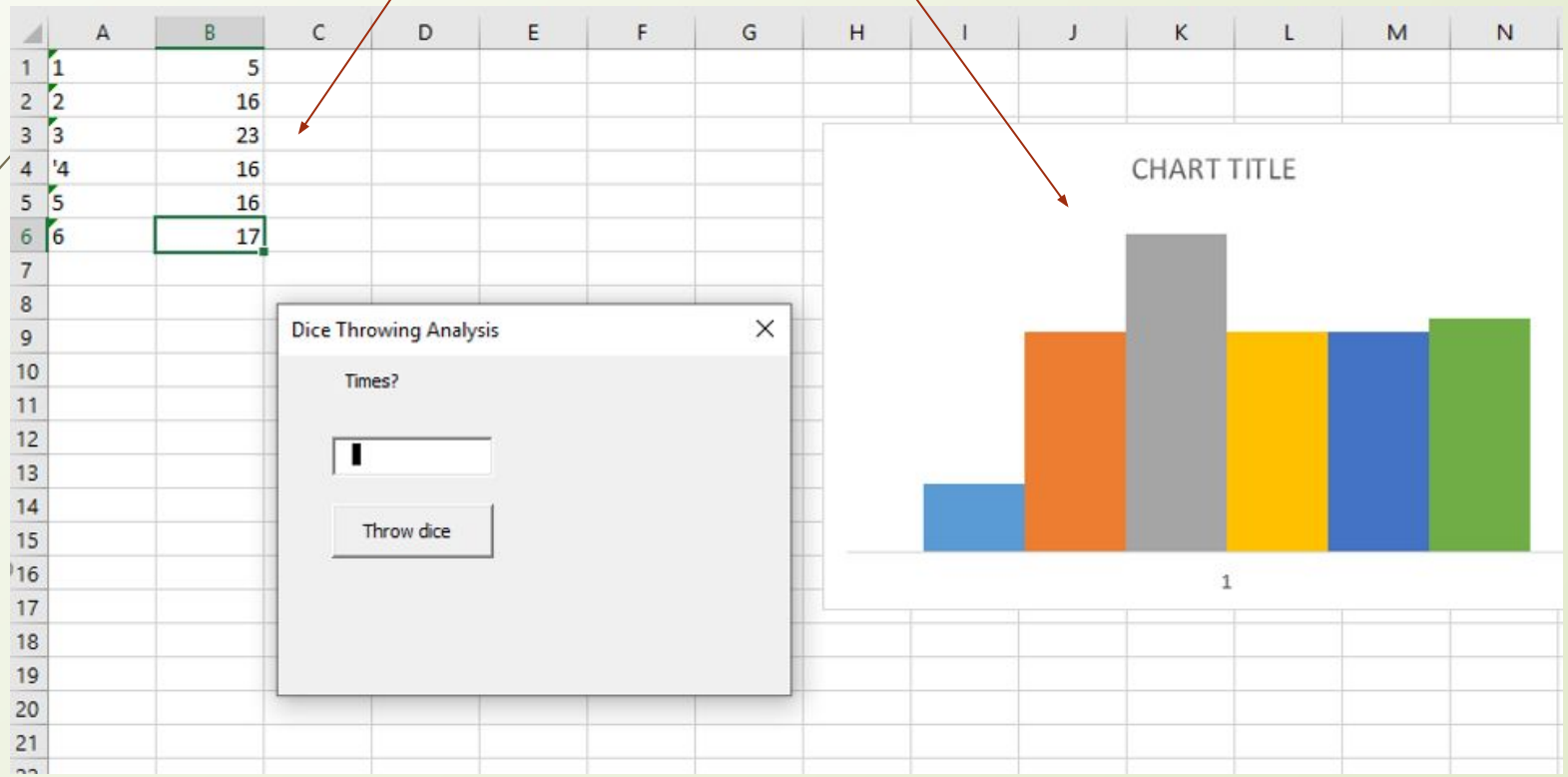
Macro & UserForm

Excel 2

Amounts of each dice value are calculated!
App shows amount also as a column chart!

Adding UserForm
Test run



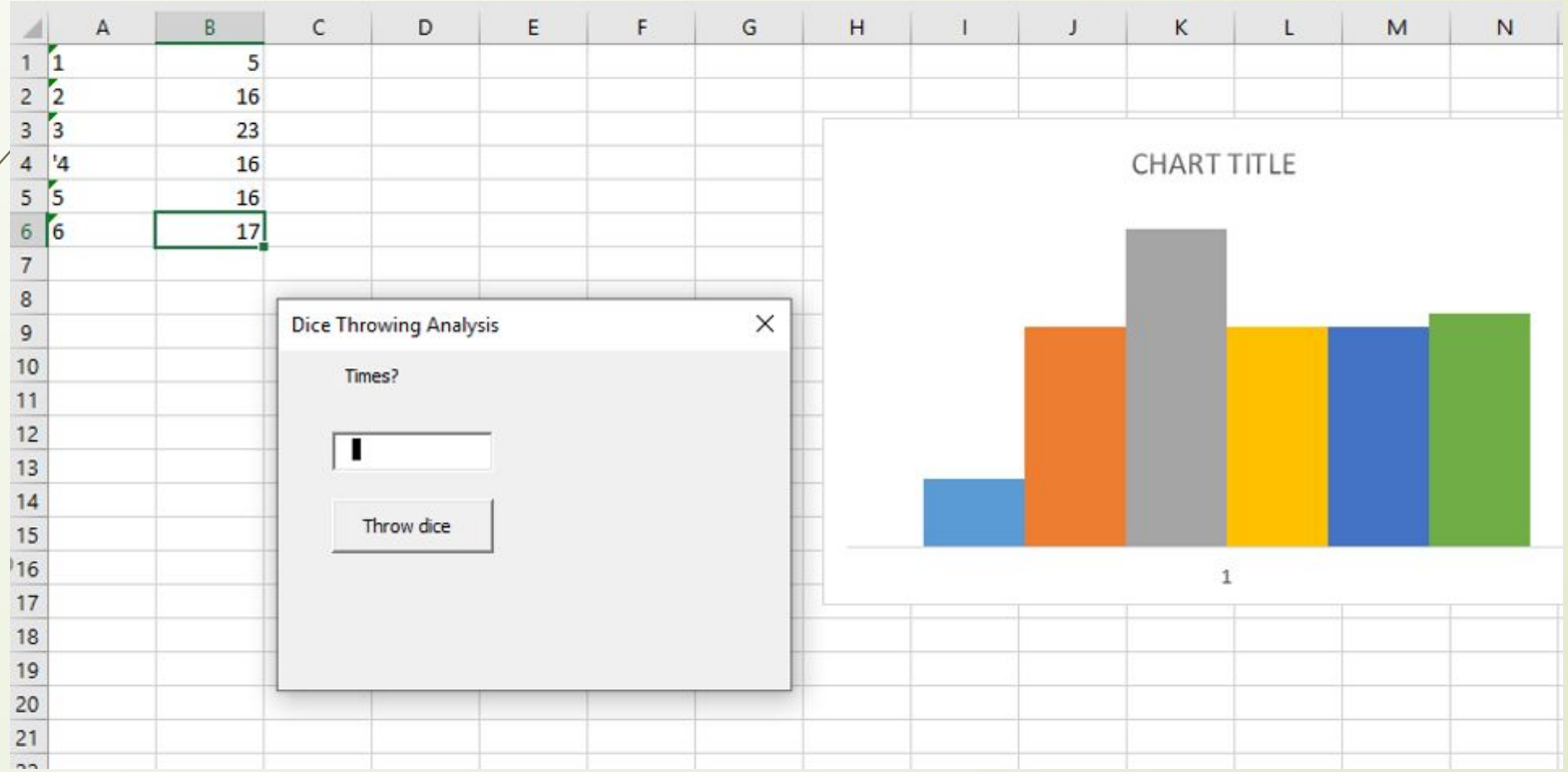
Kakelino's Code School

Macro & UserForm

Adding UserForm

Test run

Excel 2



Excel 2

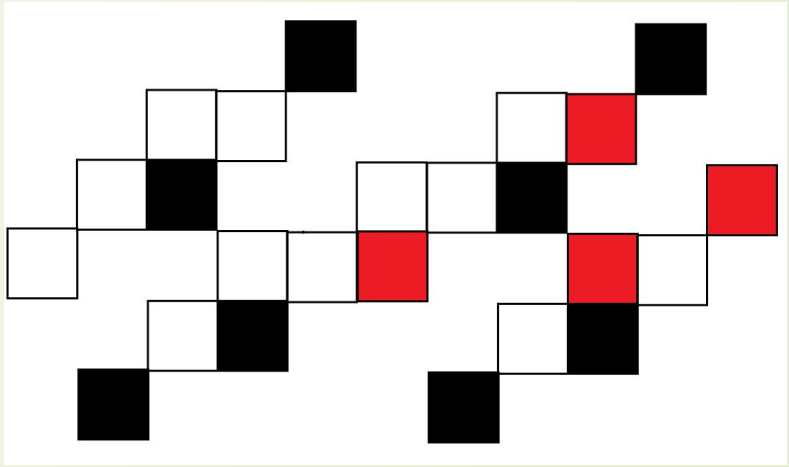
Try it!

Create your own Excel apps!

Note: when you save Excel workbook check that file is saved with macros.

Kakelino's Code School

Excel 3

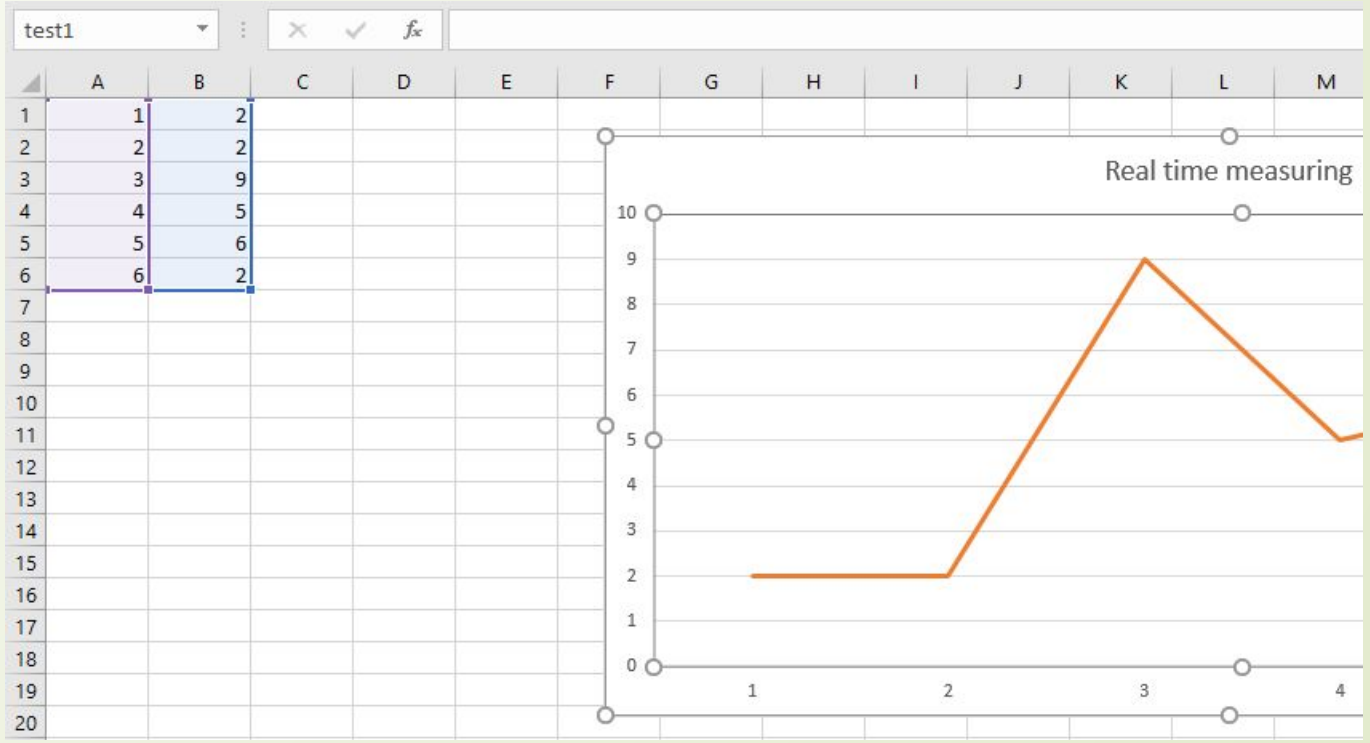


Macros and User Form

Kakelino's Code School

Excel 3

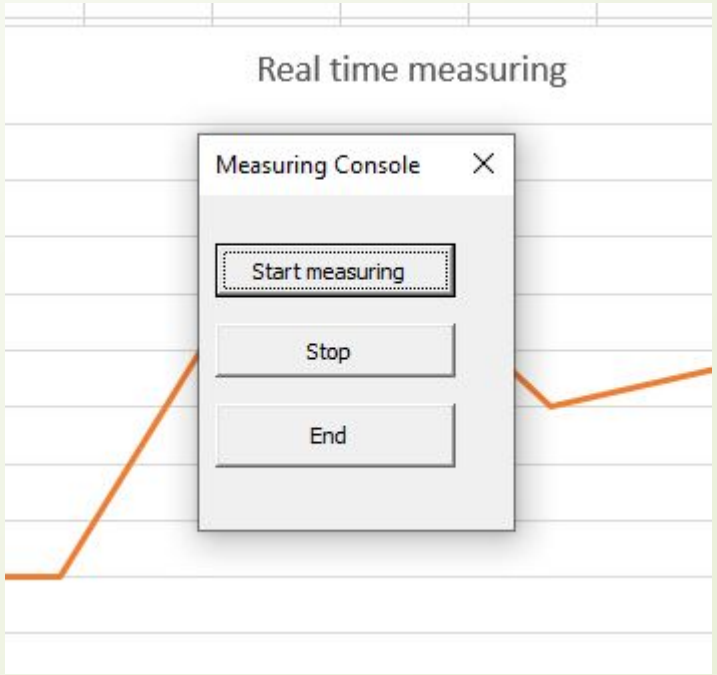
Output here, note: chart has been given a new name (used in macroes)



Kakelino's Code School

Excel 3

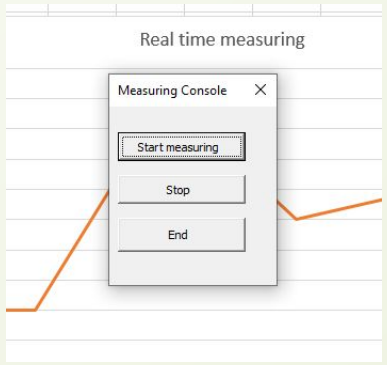
Macro & UserForm
realtime measuring & graph



Kakelino's Code School

Macro & UserForm
realtime measuring & graph

Excel 3



Timing function

```
Sub timing()
  Dim starting, ending, delay, k
  delay = 2
  ending = 10

  starting = Timer
  Application.ScreenUpdating = True

  For k = 1 To ending Step 1
    ActiveSheet.ChartObjects("test1").Activate
    ActiveSheet.ChartObjects("test1").Select
    ActiveChart.Refresh
    Application.Wait (Now + TimeValue("0:00:1"))
    printThis
  Next
End Sub
```

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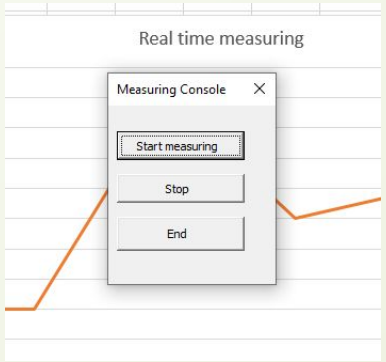
Macro & UserForm
realtime measuring & graph

Excel 3

Random values are generated to simulate measuring…




```
Sub printThis()
 Application.EnableCancelKey = xlInterrupt
 Dim values(6) As Integer

 Dim k As Integer
 Dim amount As Integer
 amount = 6

 For k = 1 To amount Step 1
  values(k) = Rnd * 10 + 1
 Next

 For k = 1 To amount Step 1
   Cells(k, 1).Value = k
 Next

 For k = 1 To amount Step 1
  Cells(k, 2).Value = values(k)
 Next

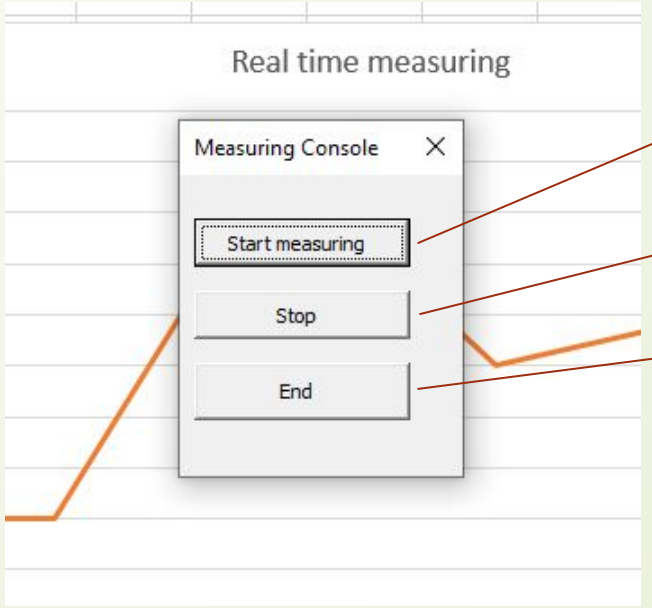
End Sub
```

Kakelino's Code School

Macro & UserForm
realtime measuring & graph

Excel 3

Event handling



Excel_examples_1.xlsm - UserForm1 (Code)

CommandButton3 | Click

```
Private Sub CommandButton1_Click()
  Sheet1.timing
End Sub

Private Sub CommandButton2_Click()
    Stop
End Sub

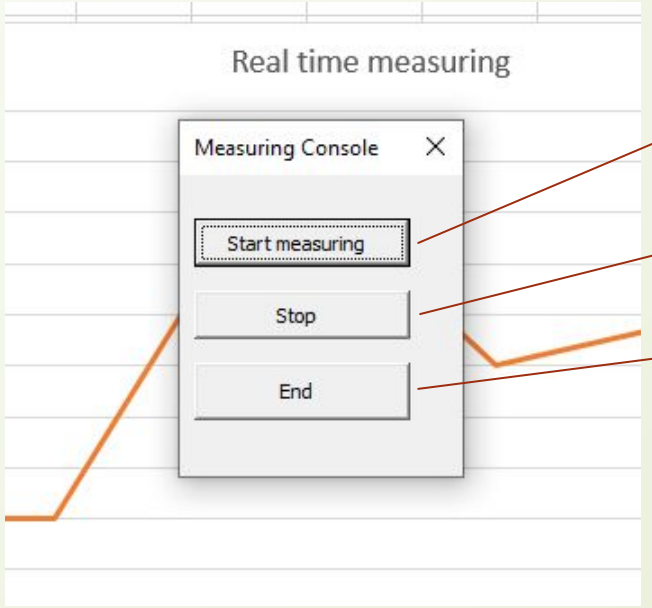
Private Sub CommandButton3_Click()
  End
End Sub
```

Kakelino's Code School

Macro & UserForm
realtime measuring & graph

Excel 3

Event handling



Excel_examples_1.xlsm - UserForm1 (Code)

CommandButton3 | Click

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Private Sub CommandButton1_Click()
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End Sub

Private Sub CommandButton3_Click()
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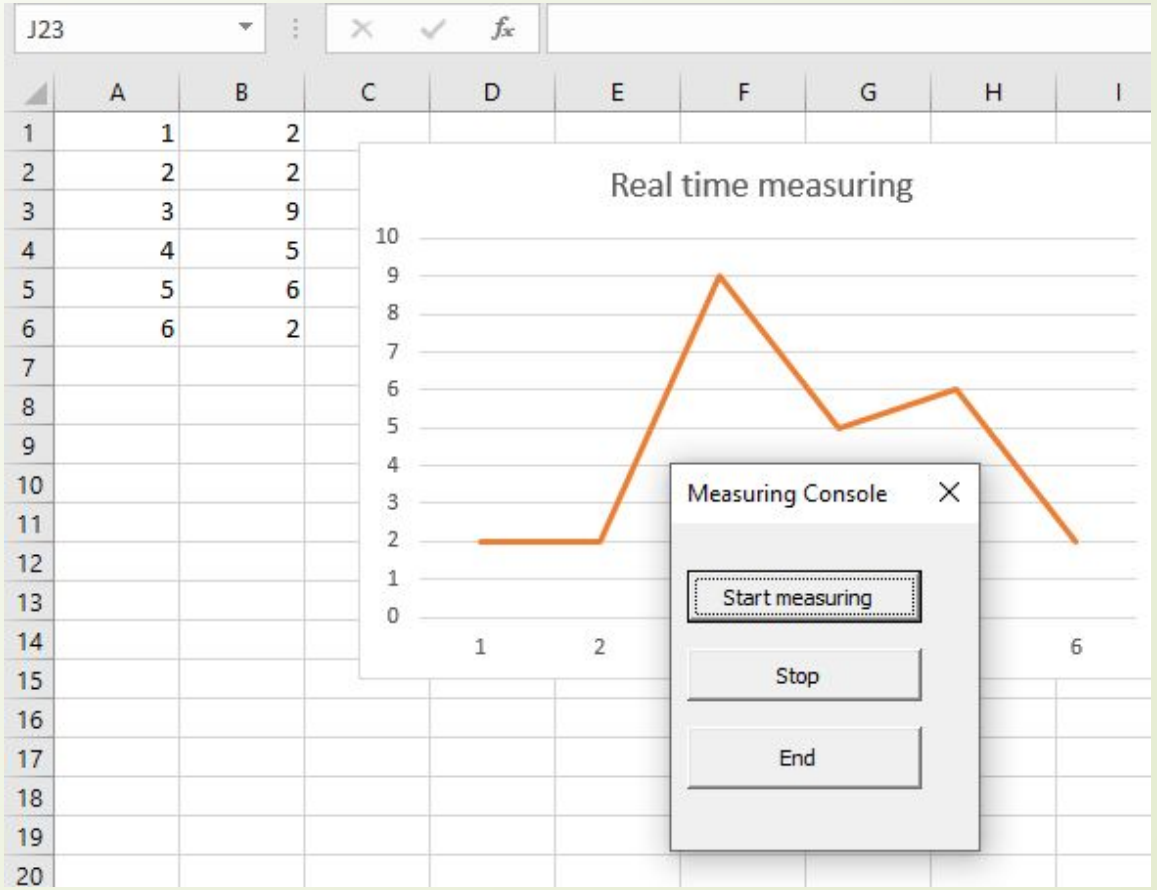
End Sub
```

Kakelino's Code School

Macro & UserForm
realtime measuring & graph

Excel 3



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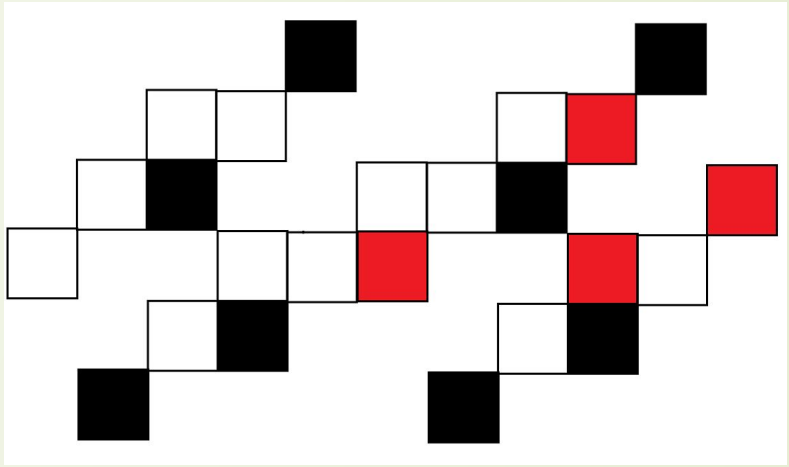
Excel 4

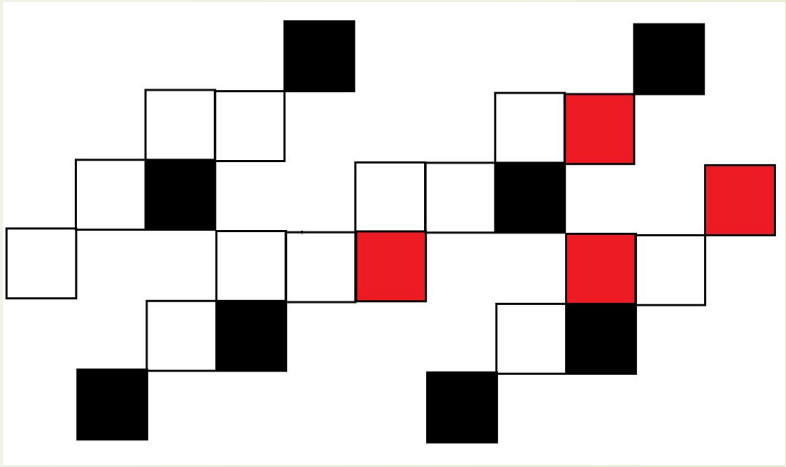


Dice and probabilities

Kakelino's Code School

Excel 4

Throw dice



Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Then we calculate all possible dice number sums and their probabilities!

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Throw dice 2 times: What sums you can get?

	A	B	C	D	E	F	G	H	I
1				2. throw					
2			1	2	3	4	5	6	
3	1. throw	1	3	5	7	9	11	13	
4		2	4	6	8	10	12	14	
5		3	5	7	9	11	13	15	
6		4	6	8	10	12	14	16	
7		5	7	9	11	13	15	17	
8		6	8	10	12	14	16	18	

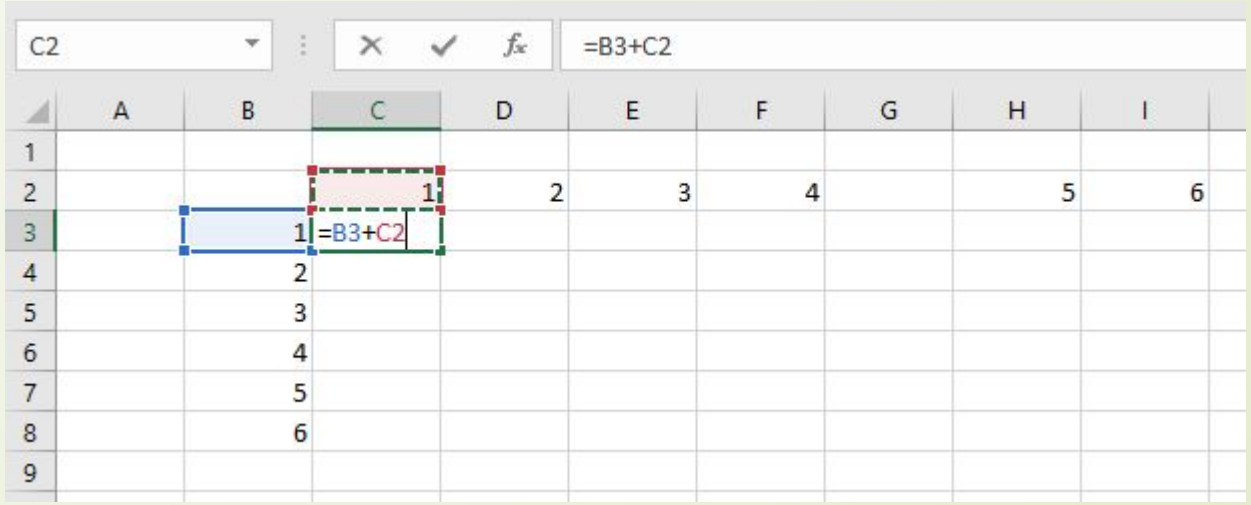
Sums

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Create the formula a)



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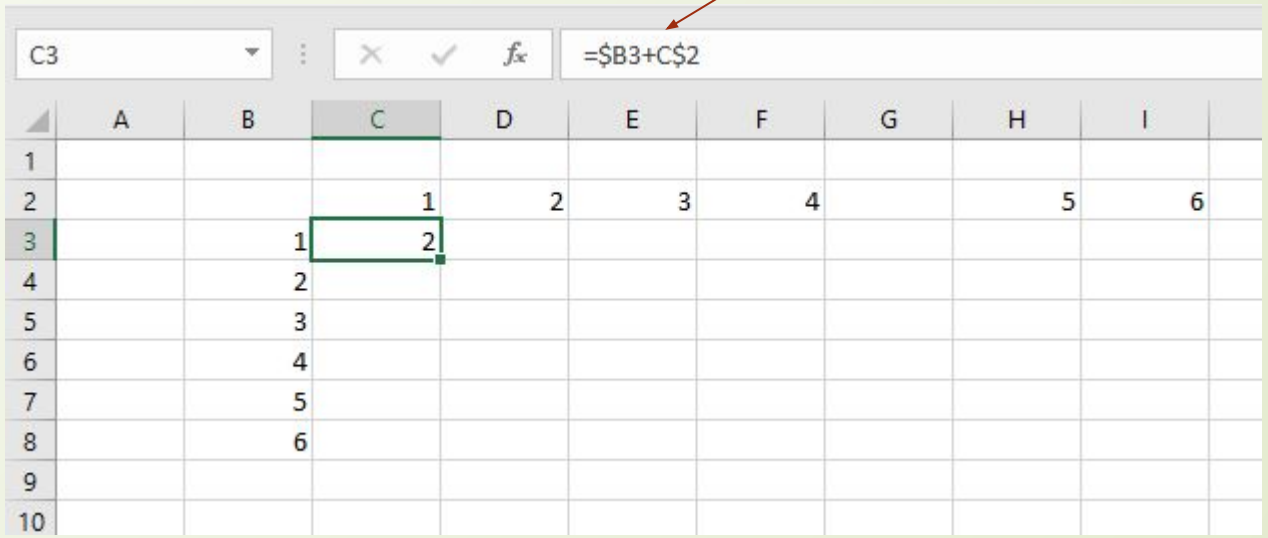
Throw dice

We are throwing dice a) 2 times and b) three times!

Create the formula b)

Note absolute references

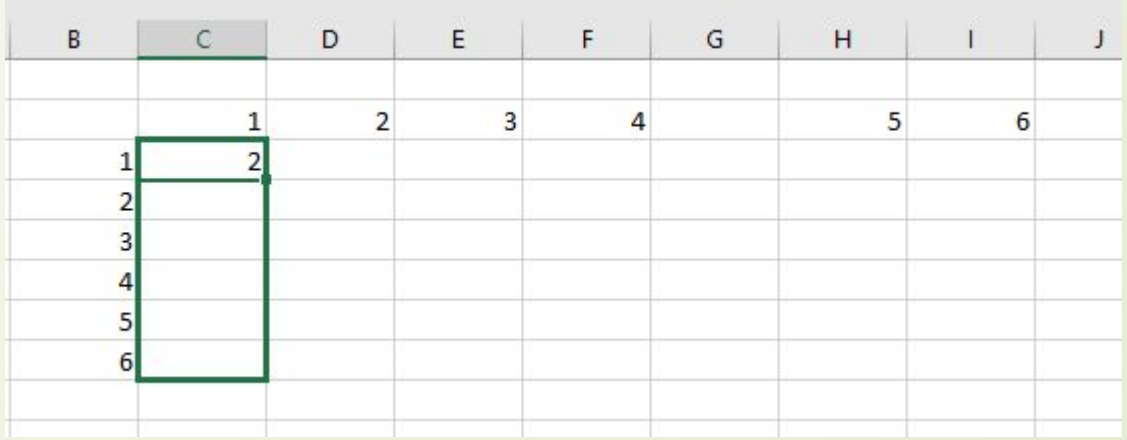


Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Fill the column cells with the formula:



Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Fill the column cells with the formula:

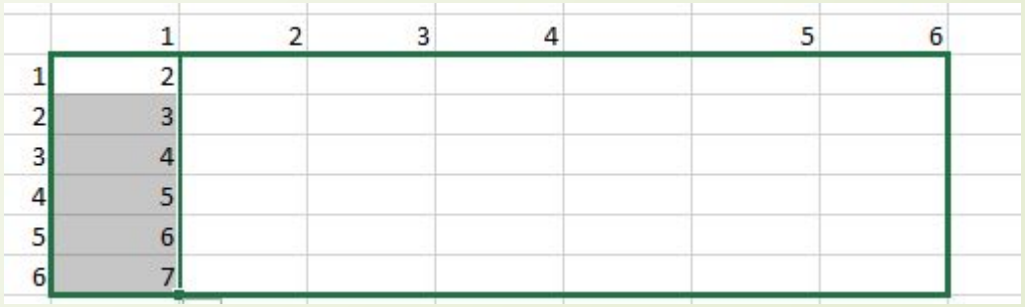
	1	2	3	4		5	6
1	2						
2	3						
3	4						
4	5						
5	6						
6	7						

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Fill all columns:



	1	2	3	4	5	6
1	2					
2	3					
3	4					
4	5					
5	6					
6	7					

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Fill all columns:

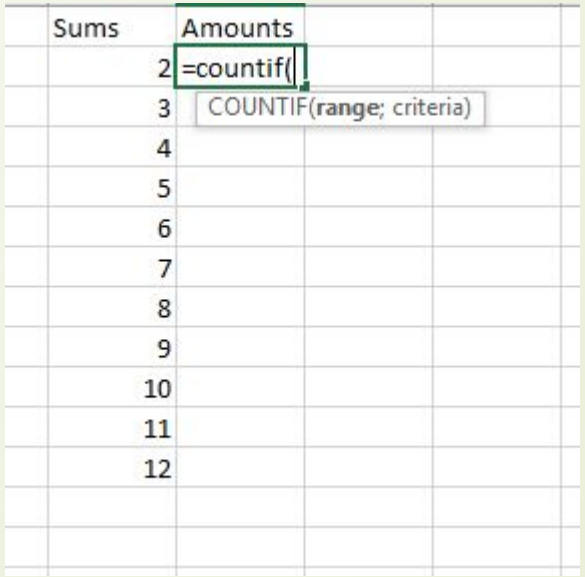
	1	2	3	4		5	6
1	2	3	4	5	1	6	7
2	3	4	5	6	2	7	8
3	4	5	6	7	3	8	9
4	5	6	7	8	4	9	10
5	6	7	8	9	5	10	11
6	7	8	9	10	6	11	12

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:

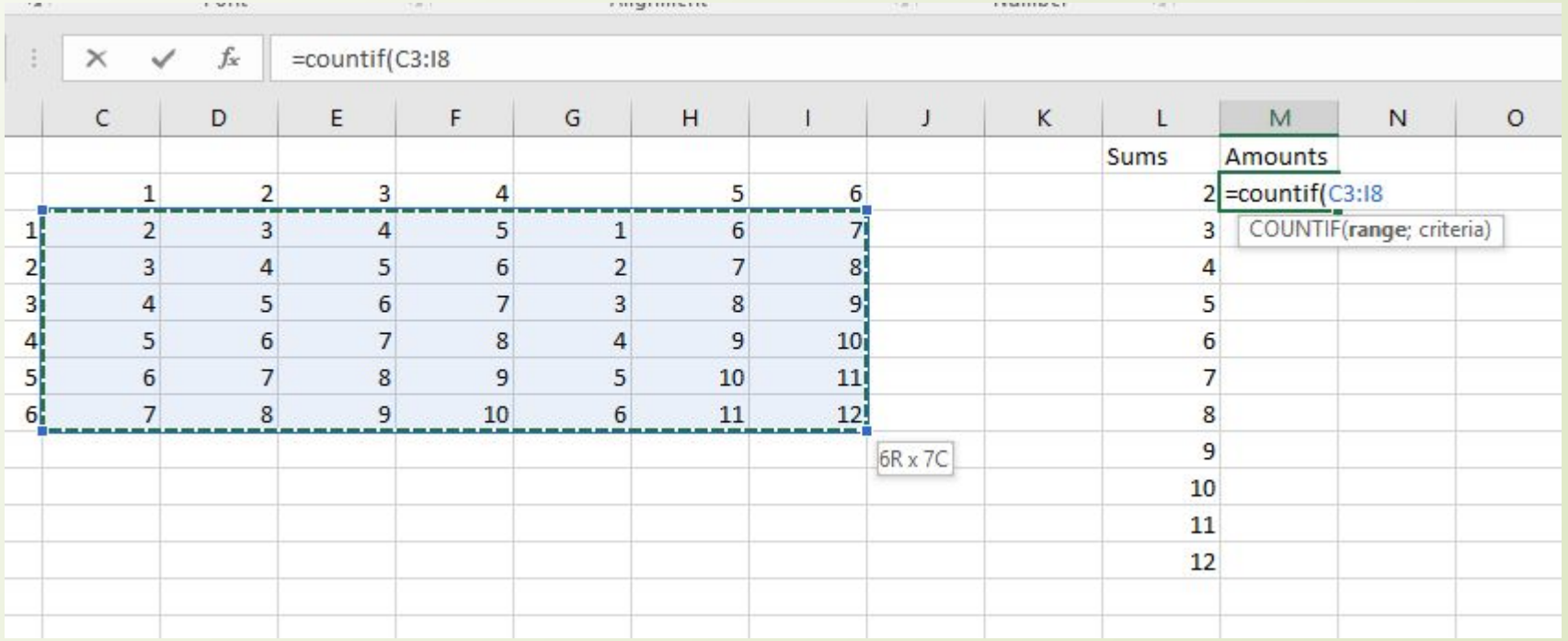


Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:

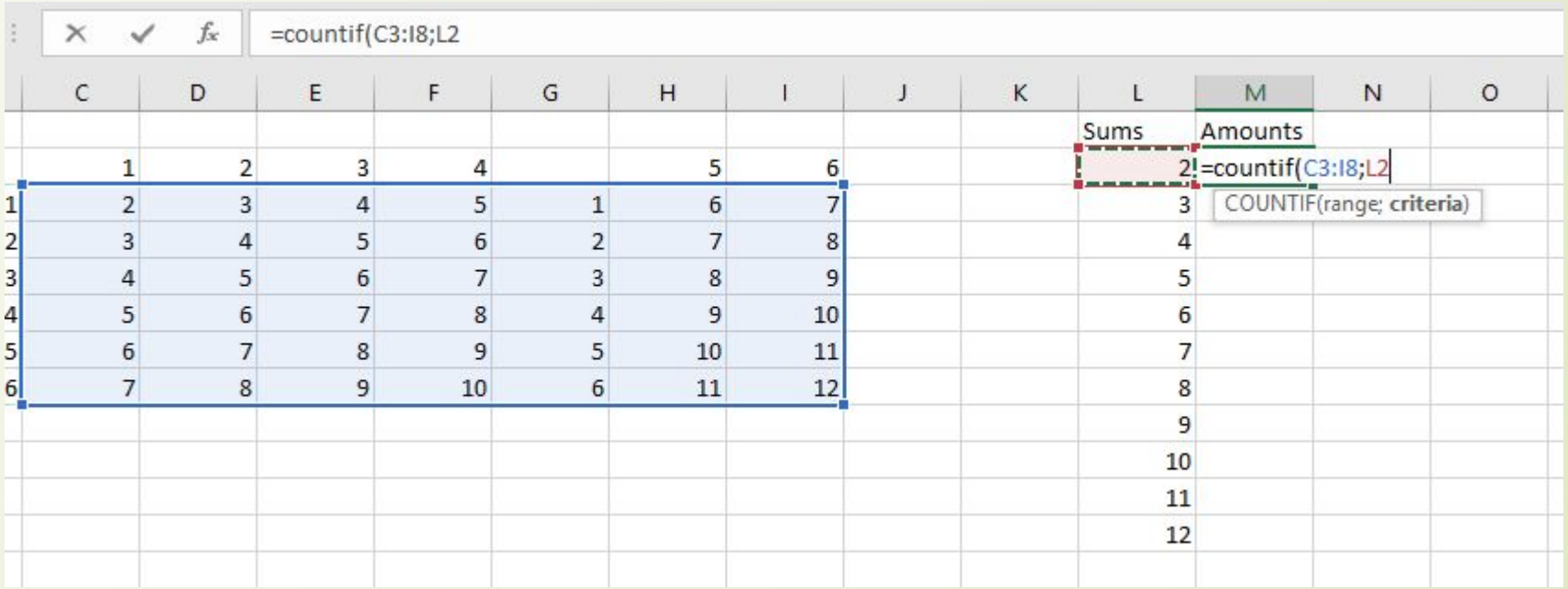


Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:



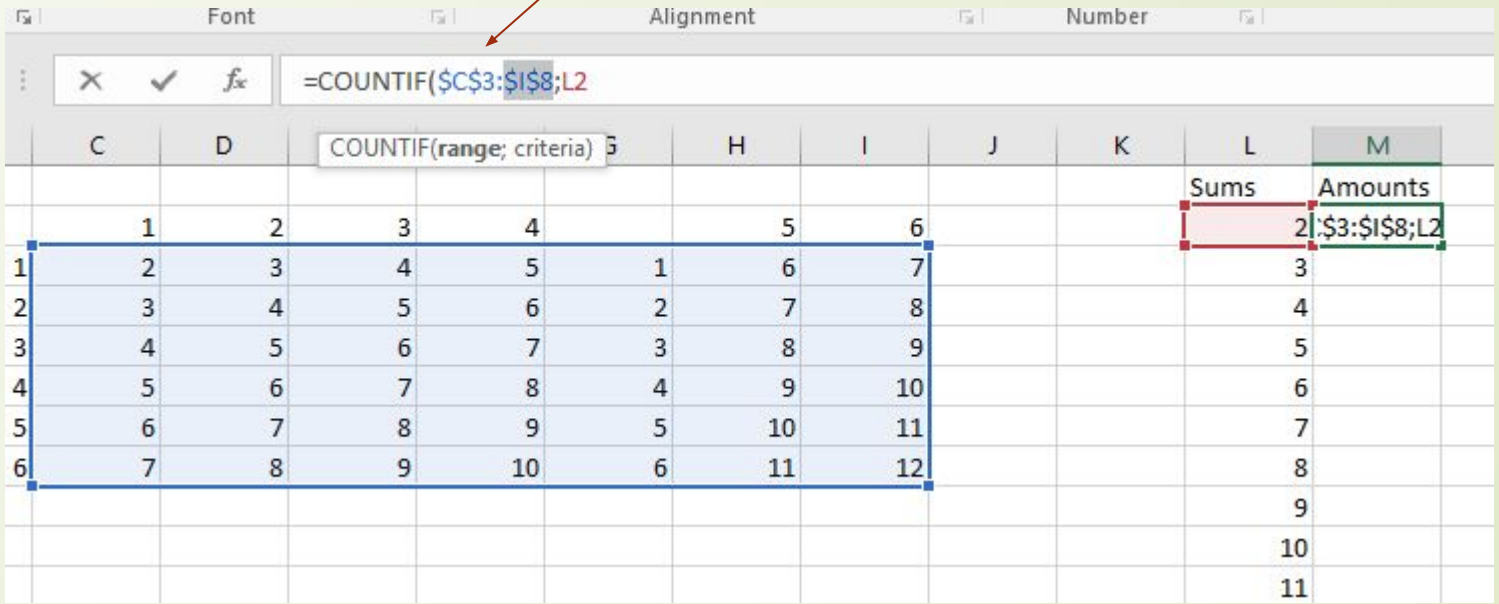
Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:

Absolute references!



	1	2	3	4		5	6
1	2	3	4	5	1	6	7
2	3	4	5	6	2	7	8
3	4	5	6	7	3	8	9
4	5	6	7	8	4	9	10
5	6	7	8	9	5	10	11
6	7	8	9	10	6	11	12

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:

Fill with the formula

=COUNTIF($D$3:$I$8;L2)

	C	D	E	F	G	H	I	J	K	L	M
										Sums	Amounts
	1	2	3	4		5	6			2	1
1	2	3	4	5	1	6	7			3	
2	3	4	5	6	2	7	8			4	
3	4	5	6	7	3	8	9			5	
4	5	6	7	8	4	9	10			6	
5	6	7	8	9	5	10	11			7	
6	7	8	9	10	6	11	12			8	
										9	
										10	
										11	
										12	

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Calculate amounts of different sums:

	L	M
	Sums	Amounts
	2	1
	3	2
	4	3
	5	4
	6	5
	7	5
	8	5
	9	4
	10	3
	11	2
	12	1

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Probabilities:

	L	M	N
	Sums	Amounts	Probabilities
	2	1	=M2/26
	3	2	
	4	3	
	5	4	
	6	5	
	7	5	
	8	5	
	9	4	
	10	3	
	11	2	
	12	1	

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

Probabilities:

	L	M	N
	Sums	Amounts	Probabilities
	2	1	4 %
	3	2	8 %
	4	3	12 %
	5	4	15 %
	6	5	19 %
	7	5	19 %
	8	5	19 %
	9	4	15 %
	10	3	12 %
	11	2	8 %
	12	1	4 %

Kakelino's Code School

Throw dice

We are throwing dice a) 2 times and b) three times!

OK, but now we want to play a game with 3 throws!

Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!

		2. throw						
		1	2	3	4	5	6	
1. throw	1	1	1	1	1	1	1	1
	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4
	5	5	5	5	5	5	5	5
	6	6	6	6	6	6	6	6

3. throw	1							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	2							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	3							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	4							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

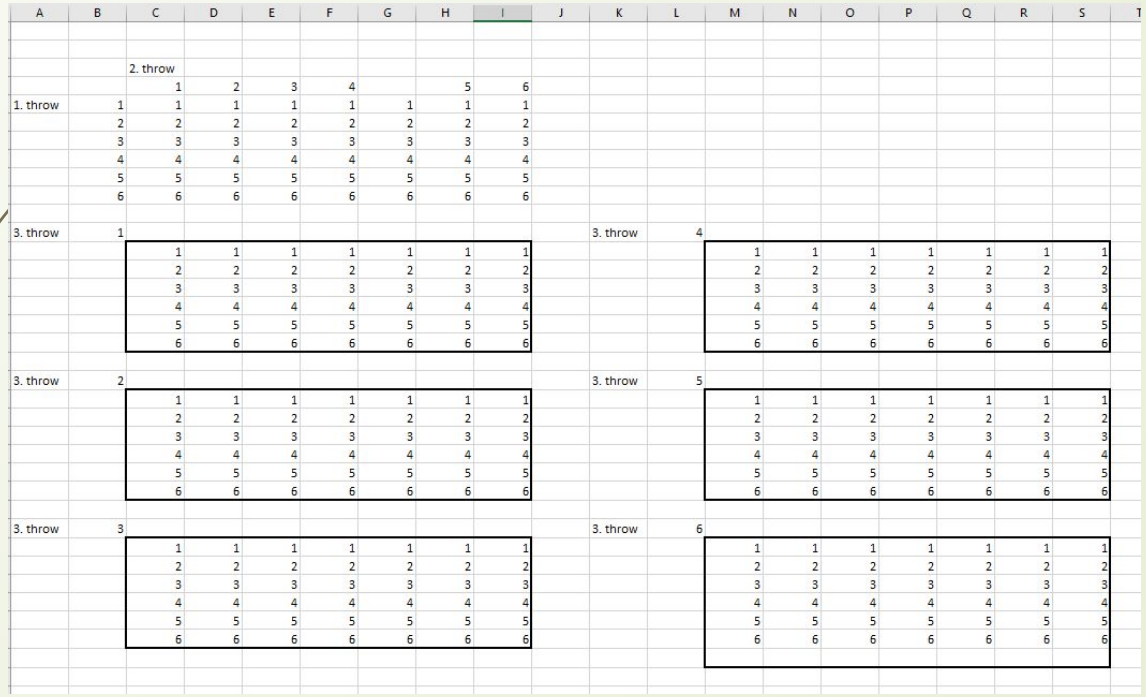
3. throw	5							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	6							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!



		2. throw						
		1	2	3	4	5	6	
1. throw	1	1	1	1	1	1	1	1
	2	2	2	2	2	2	2	2
	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4
	5	5	5	5	5	5	5	5
	6	6	6	6	6	6	6	6

3. throw	1							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	2							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	3							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	4							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	5							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

3. throw	6							
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

There 226 sums coming (6*6*6).

We could present this as a 3D model, too

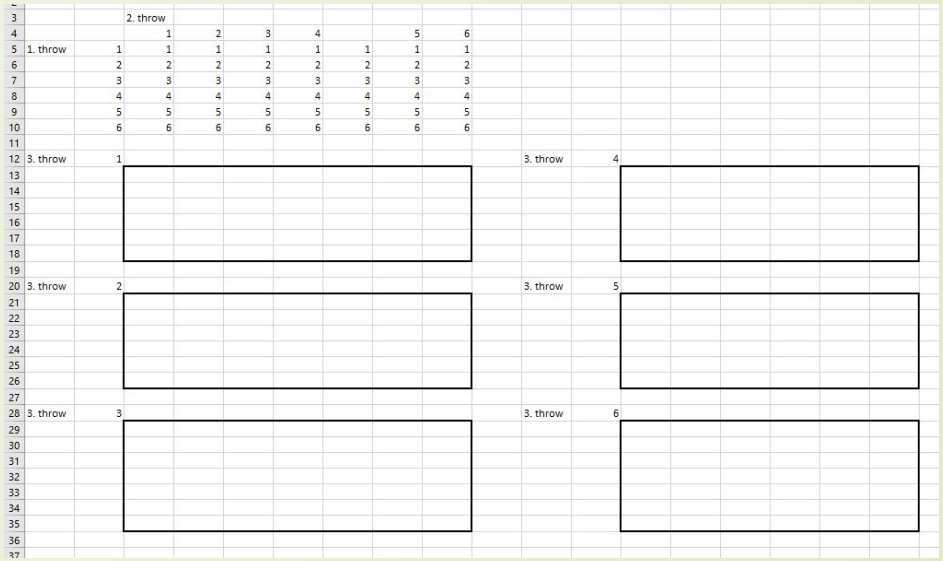
Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!

How to calculate possible sums easily?

- Choose first the sum value of 3. throw (1-6) one by one.
- Then copy it to clipboard and chooce the range where you have all 2 throw sums and choose paste special and add 1



Kakelino's Code School

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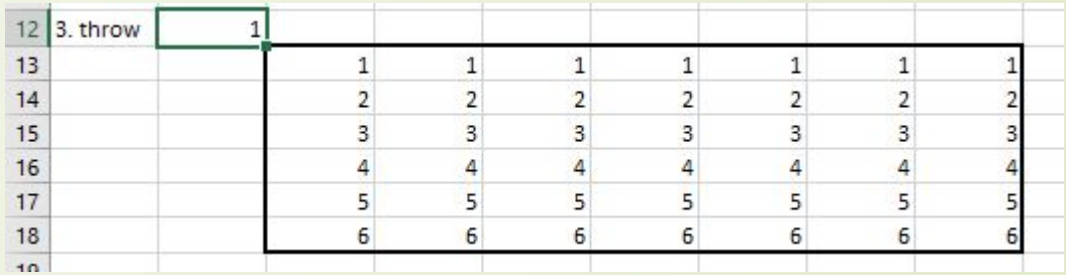

12	3. throw	1							
13			1	1	1	1	1	1	1
14			2	2	2	2	2	2	2
15			3	3	3	3	3	3	3
16			4	4	4	4	4	4	4
17			5	5	5	5	5	5	5
18			6	6	6	6	6	6	6

Kakelino's Code School

OK, but now we want to play a game with 3 throws!

Throw dice

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- Choose first the sum value of 3. throw (1-6) one by one.
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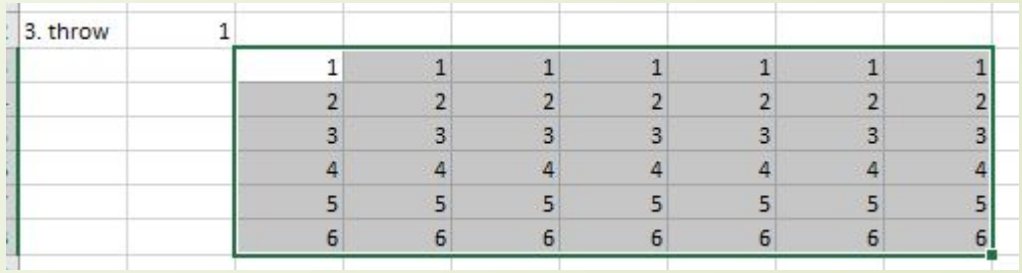

3. throw	1						
		1	1	1	1	1	1	1
		2	2	2	2	2	2	2
		3	3	3	3	3	3	3
		4	4	4	4	4	4	4
		5	5	5	5	5	5	5
		6	6	6	6	6	6	6

Kakelino's Code School

OK, but now we want to play a game with 3 throws!

Throw dice

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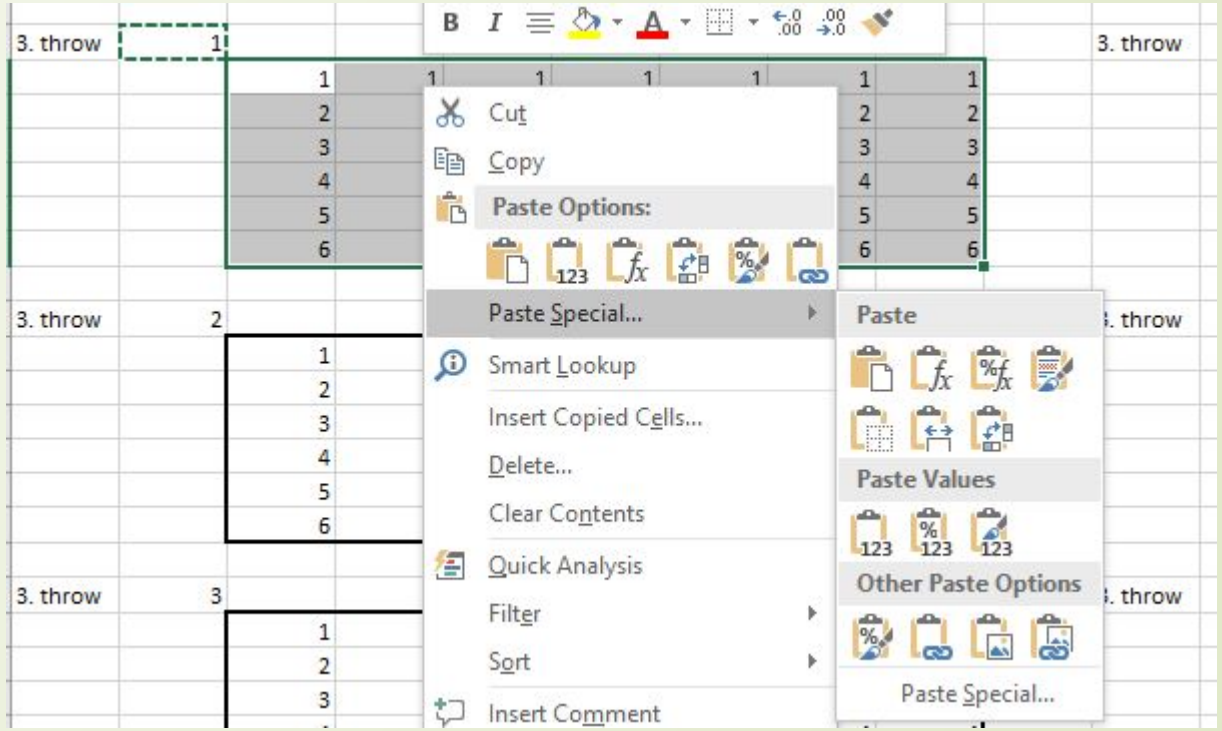


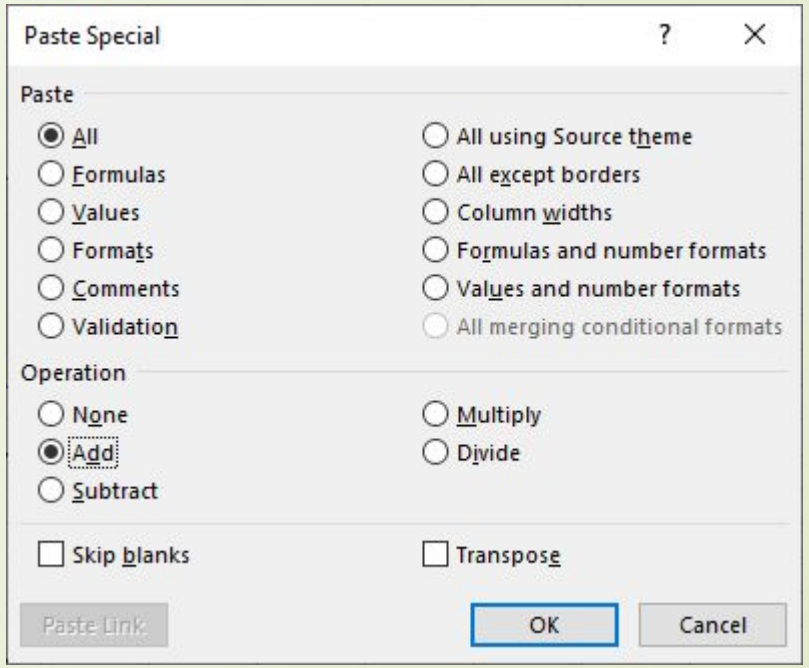
Kakelino's Code School

OK, but now we want to play a game with 3 throws!

Throw dice

How to calculate possible sums easily?

- Choose first the sum value of 3. throw (1-6) one by one.
- Then copy it to clipboard and chooce the range where you have all 2 throw sums and choose paste special and add 1



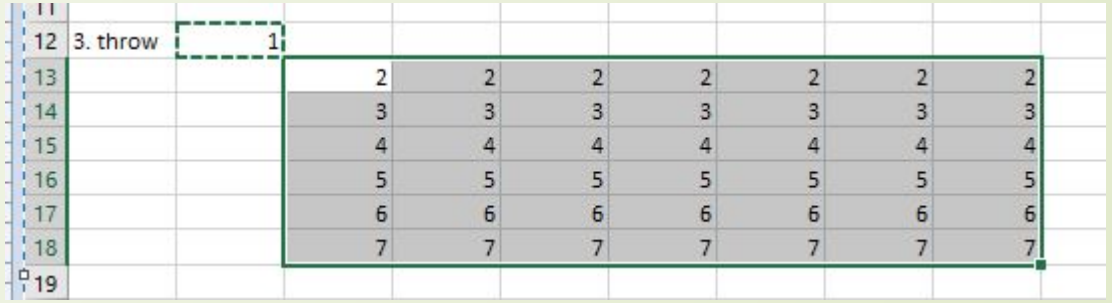
Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!

How to calculate possible sums easily?

- Choose first the sum value of 3. throw (1-6) one by one.
- Then copy it to clipboard and chooce the range where you have all 2 throw sums and choose paste special and add 1



12	3. throw	1						
13			2	2	2	2	2	2	2
14			3	3	3	3	3	3	3
15			4	4	4	4	4	4	4
16			5	5	5	5	5	5	5
17			6	6	6	6	6	6	6
18			7	7	7	7	7	7	7
19									

Do similarly with other 3. throws!

Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!

3. throw	1						
	2	2	2	2	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7

3. throw	2						
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8

3. throw	3						
	4	4	4	4	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

3. throw	4						
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9
	10	10	10	10	10	10	10

3. throw	5						
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9
	10	10	10	10	10	10	10
	11	11	11	11	11	11	11

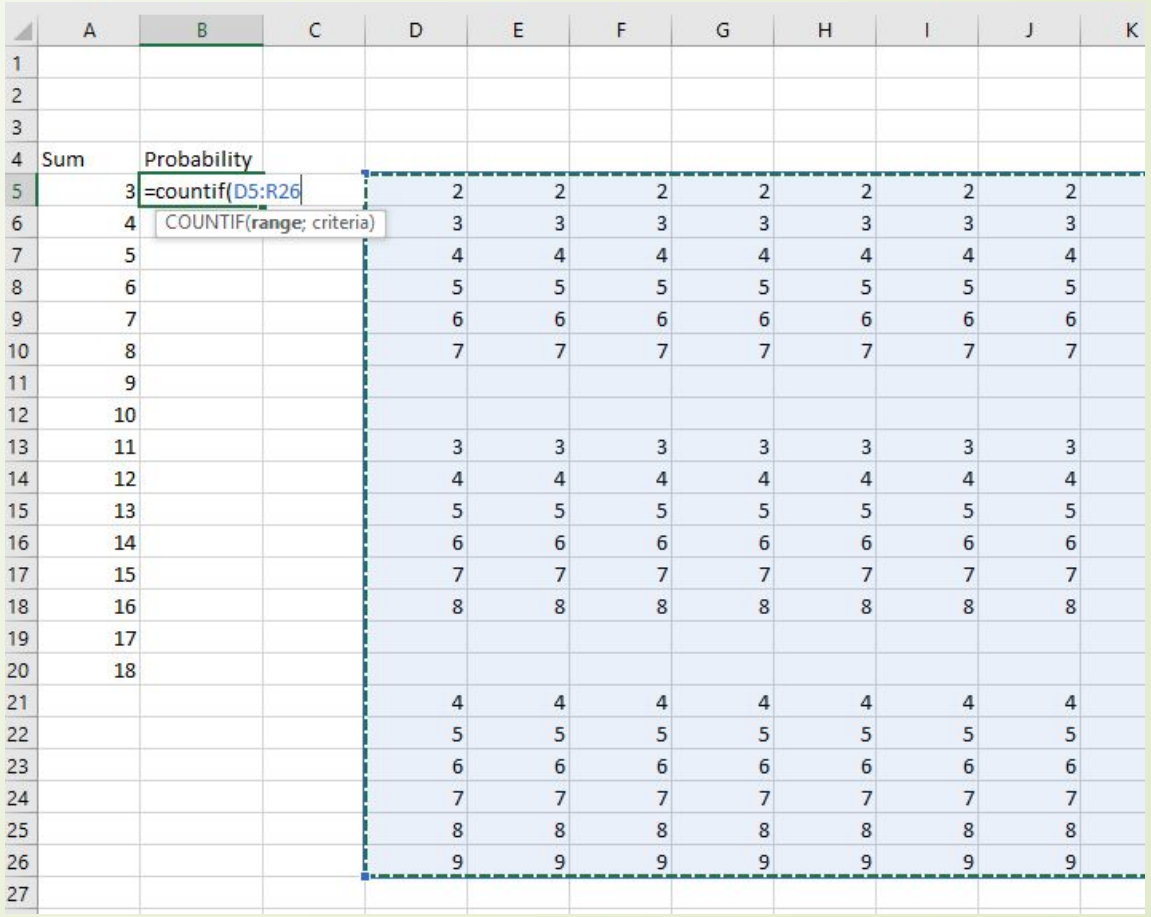
3. throw	6						
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9
	10	10	10	10	10	10	10
	11	11	11	11	11	11	11
	12	12	12	12	12	12	12

Kakelino's Code School

Throw dice

Probabilities

OK, but now we want to play a game with 3 throws!



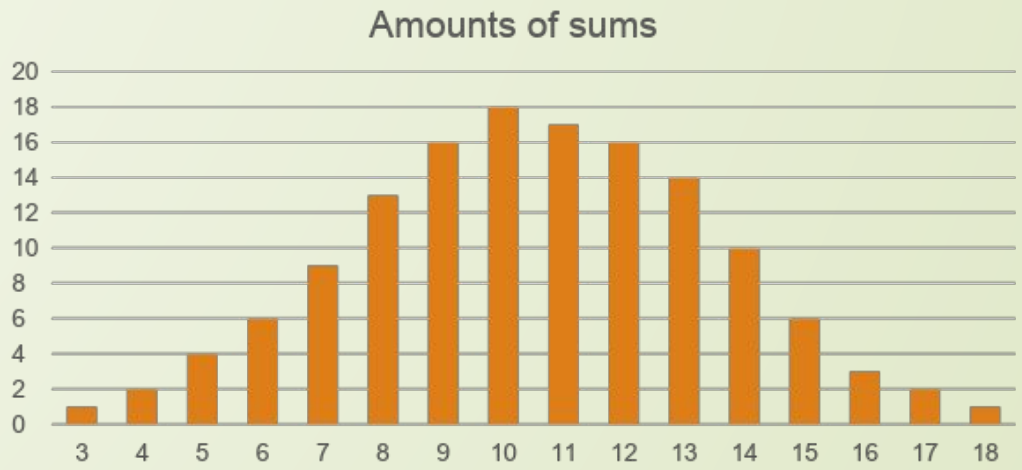
Kakelino's Code School

Throw dice

OK, but now we want to play a game with 3 throws!

Probabilities

Sum	Probability
3	1,3 %
4	2,7 %
5	4,4 %
6	6,6 %
7	9,3 %
8	11,5 %
9	12,8 %
10	13,3 %
11	12,8 %
12	11,5 %
13	9,3 %
14	6,6 %
15	4,4 %
16	2,7 %
17	1,3 %
18	0,4 %



Kakelino's Code School

Throw dice

Try it!

There can be found other ways to calculate sums…

Study more!