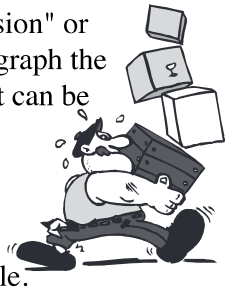
Cumulative Frequency and Interquartile Range.

Cumulative frequency is based on a running total. You have to plot the points at the **upper boundary** of each group interval as you are accumulating the data into groups. The shape of the curve is called curve an **ogive**.

We can use a cumulative frequency graph to find a convenient measure of the "dispersion" or "variation" in the data. Split the cumulative frequency into quarters, then read off the graph the appropriate values. From these values the interquartile range can be found. A Box Plot can be drawn above or below the graph in line with the relative readings.



1). Here are the sizes of 80 tulips.

Height, h, cm.	Frequency.	Cum. Freq.
$0 < h \leq 4$	8	8
$4 < h \leq 8$	27	35
$8 < h \leq 12$	21	
$12 < h \leq 16$	16	
$16 < h \leq 20$	7	
$20 < h \leq 24$	1	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Use the graph to find how many tulips are between 5 and 11 cm tall.

2). Here are the weights of 120 pupils.

Weight, w, kg.	Frequency.	Cum. Freq.
$0 < w \leq 20$	8	8
$20 < w \leq 40$	41	49
$40 < w \leq 60$	53	
$60 < w \leq 80$	16	
$80 < w \leq 100$	2	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Use the graph to find how many pupils weigh between 30 and 50 kg.

3). Here are the ages of 100 people in a village.

Age, a, Yrs.	Frequency.	Cum. Freq.
$0 < a \leq 15$	14	14
$15 < a \leq 30$	35	
$30 < a \leq 45$	27	
$45 < a \leq 60$	16	
$60 < a \leq 75$	8	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Use the graph to find how many villagers are between 20 and 40 years old.

4). Here are the marks (out of 60) for 180 Year 11 pupils.

Mark, m.	Frequency.	Cum. Freq.
$0 < m \leq 12$	16	
$12 < m \leq 24$	49	
$24 < m \leq 36$	67	
$36 < m \leq 48$	32	
$48 < m \leq 60$	16	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). A pupil will get a grade A if they score over 54 marks. Use the graph to find how many pupils get a grade A.

5). Here are the times that 30 pupils could hold their breath for.

Time, t, secs.	Frequency.	Cum. Freq.
$0 < t \leq 20$	3	
$20 < t \leq 40$	11	
$40 < t \leq 60$	12	
$60 < t \leq 80$	3	
$80 < t \leq 100$	1	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Use the graph to find the **percentage** of pupils that can hold their breath for more than 58 seconds.

6). Here are the long jump records for 50 pupils.

Distance,d, m.	Frequency.	Cum. Freq.
$1.00 < d \leq 1.20$	3	
$1.20 < d \leq 1.40$	5	
$1.40 < d \leq 1.60$	27	
$1.60 < d \leq 1.80$	12	
$1.80 < d \leq 2.00$	3	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). A pupil will get a gold certificate if he/she jumps over 1.72 metres.
Use the graph to find the **percentage** of pupils that get gold certificates.

7). A shirt company measures the length of 90 people's arms.

Length, l, cm.	Frequency.	Cum. Freq.
$40 < l \leq 44$	7	
$44 < l \leq 48$	19	
$48 < l \leq 52$	37	
$52 < l \leq 56$	22	
$56 < l \leq 60$	5	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). The company only makes shirts of arm length 46 - 55 cm.
Use the graph to find the **percentage** of people that the shirts will fit.

8). Here are the percentages Year 9 scored in their exams.

Mark, m.	Frequency.	Cum. Freq.
51 - 60	27	
61 - 70	42	
71 - 80	49	
81 - 90	37	
91 - 100	9	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Pupils who scored between 75 and 85 marks got a silver certificate.
Use the graph to find the **percentage** of pupils that got a silver certificate.

9). Here are the I.Q.'s of the teachers.

I.Q.	Frequency.	Cum. Freq.
111 - 120	1	
121 - 130	7	
131 - 140	21	
141 - 150	17	
151 - 160	2	

a). Copy and complete the table.
b). Draw a cumulative frequency graph.
c). Use your graph to find
i). an estimate for the median,
ii). the interquartile range.
d). Draw a box plot on the graph.
e). Teachers can go on Mastermind if they have an I.Q. over 141.
Use the graph to find the **percentage** of teachers that can enter Mastermind.