

**A.2.2 Graphical representations: bar chart, circular chart, bar chart.**

**Polygon of counts (and frequencies). Histogram. Cumulative curves:**

**A.2.2.1 Case of a qualitative variable:**

**a. Pie (circle) chart:**

A pie chart, sometimes called a circle chart, is a way of summarizing a set of data or displaying the different values of a given variable (e.g. percentage distribution). In This type of chart, the modalities are represented by an angular sector of a disk (or half-disk), the angle of which is proportional to the count or frequency. So, we make a cross product to know the angle of each sector. In the case of a complete disk, we have the following correspondences:

$$N(100\%) \text{-----} 360^\circ \qquad \theta_i = \frac{n_i}{N} * 360^\circ = CP * n_i = f_i * 360^\circ$$

$$n_i (n\%) \text{-----} \theta_i$$

We can use the coefficient of proportionality:  $CP = \frac{360}{N}$

Variable	x <sub>1</sub>	x <sub>2</sub>	x <sub>3</sub>	x <sub>4</sub>	Total	Coefficient of proportionality CP=360/N
Count	n <sub>1</sub>	n <sub>2</sub>	n <sub>3</sub>	n <sub>4</sub>	N	
frequency	f <sub>1</sub> = n <sub>1</sub> /N	f <sub>2</sub> = n <sub>2</sub> /N	f <sub>3</sub> = n <sub>3</sub> /N	F <sub>4</sub> = n <sub>4</sub> /N	1	
Angles	Θ <sub>1</sub> =n <sub>1</sub> *CP =f <sub>1</sub> *360°	Θ <sub>2</sub> =n <sub>2</sub> *CP =f <sub>2</sub> *360°	Θ <sub>3</sub> =n <sub>3</sub> *CP =f <sub>3</sub> *360°	Θ <sub>4</sub> =n <sub>4</sub> *CP =f <sub>4</sub> *360°	360°	

**Example 13 :**

The study regime was studied on a sample of 200 pupils from a high school, the results obtained are as follows:

- Make the Graphical Representation of this data in pie chart using frequencies.

Education regime	External	Internal	Half boarder
Number of pupils n <sub>i</sub>	70	50	80
Frequency f <sub>i</sub>	<b>70/200=0.35</b>	<b>50/200=0.25</b>	<b>80/200=0.4</b>

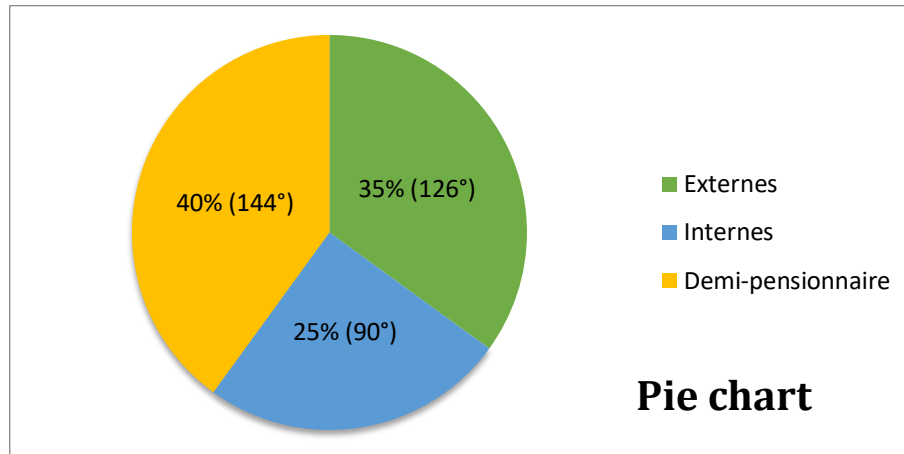
To make the pie chart of this data using frequencies, we must calculate the frequencies and the different angles θ<sub>i</sub> of each sector.

$n \text{ ----- } 360^\circ$

$\theta_i = n_i / N * 360^\circ$

$n_i \text{ ----- } d_i$

$\theta_1 = f_1 * 360^\circ = 0.35 * 360^\circ = 126^\circ, \theta_2 = f_2 * 360^\circ = 0.25 * 360^\circ = 90^\circ, \theta_3 = f_3 * 360^\circ = 0.4 * 360^\circ = 144^\circ$



**Figure. 2.1:** Pie chart shown the study regime of 200 pupils from a high school.

**b. Organ pipes:**

We put the modalities on the x-axis, arbitrarily. We carry rectangles on the y-axis (vertically or horizontally) whose length is proportional to the counts, or frequencies, of each modality.

**Example 14 :**

A survey conducted in 2015 in Algiers on the distribution of blood groups yielded the following results:

Blood groups	A	B	AB	O
Counts	219	123	78	242

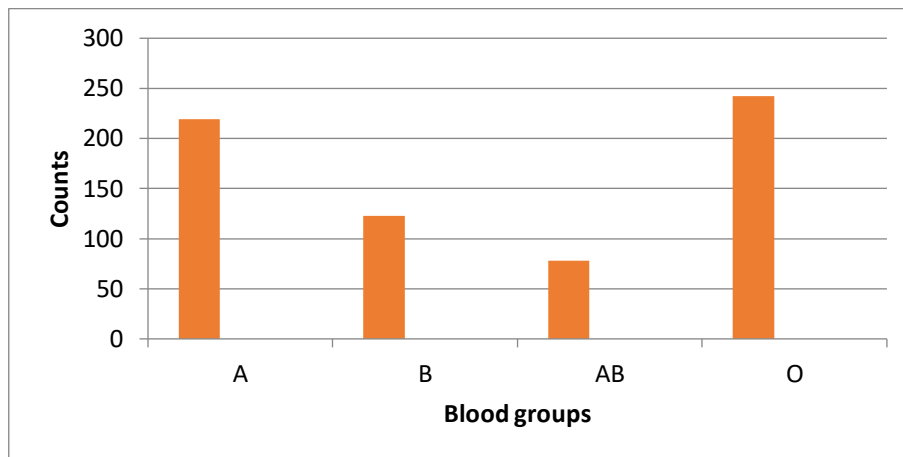


Figure. 2.2: Organ pipes shown the distribution of blood groups.

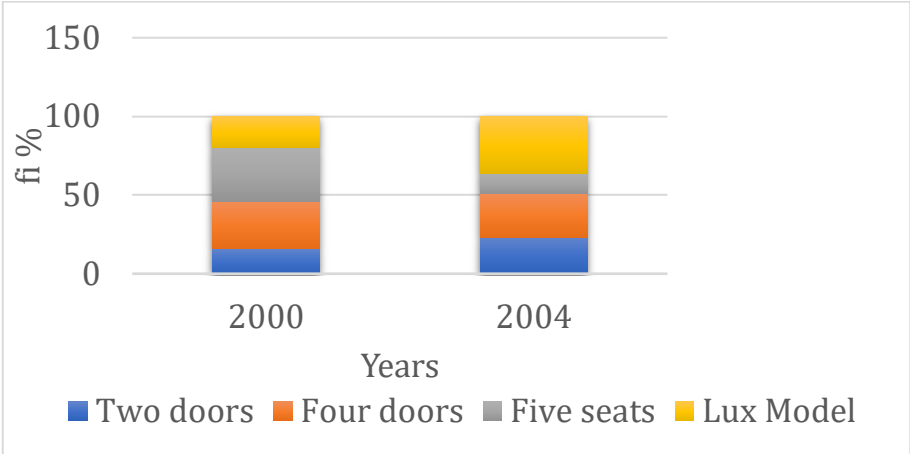
**c. Band chart:**

It consists to represent each modality in the same vertical band by a slice whose height corresponds to its frequency percentage.

**Example 15 :**

The sales made by a car manufacturing company during the years 2000 and 2004 are as follows:

Vehicles	2000		2004	
	ni	fi	ni	fi
Two doors	800	$800/5000=0.16$	1600	0.23
Four doors	1500	<b>0.3</b>	2000	0.28
Five seats	1700	<b>0.34</b>	900	0.13
Lux Model	1000	<b>0.2</b>	2500	0.36
total	5000	<b>1</b>	7000	1



**Figure. 2.3:** Band chart shown the sales made by a car manufacturing company.