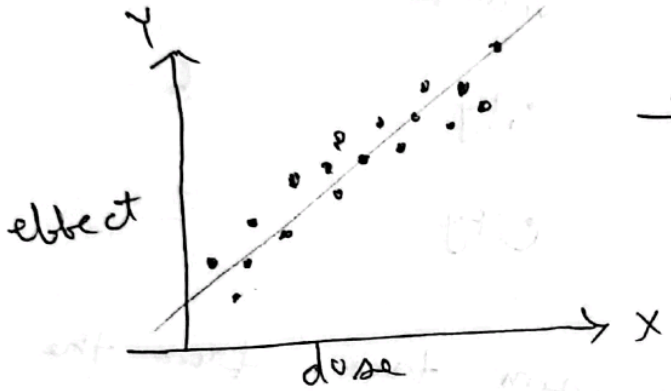
Regression Tree

→ An alternative / special type of decision tree for making regression.

→ Why is it needed?



→ We can fit a linear regression model.

→ We can't fit a lin_reg model. But we can do polynomial interpolation (e.g. lagrange polynomial)

But what if there are ≥ 1 features?

→ Lagrange polynomial, or Newtoni polynomial can handle only 1 feature (predicts y with x).

So, we need a non-parametric regressor.

ID	Age	Living	IQ
1	8	Village	1
2	10	city	3
3	12	Village	1
4	30	Village	4
5	35	City	5
6	60	City	2

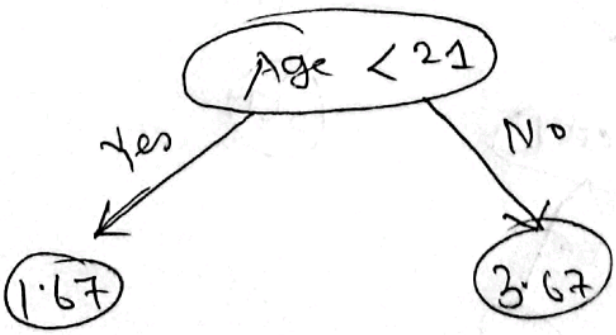
Build a regression tree from the above dataset.

Sol^n^o

Age — averages
9
11
21
32.5
47.5

Splitter	left_avg	right_avg	SSR
9	1	3	10
11	2	3	12
21	1.67	3.17	7.33 ← minimum
32.5	2.25	3.5	11.25
47.5	2.8	2	12.8
City	2	3.33	10.67

~~village~~

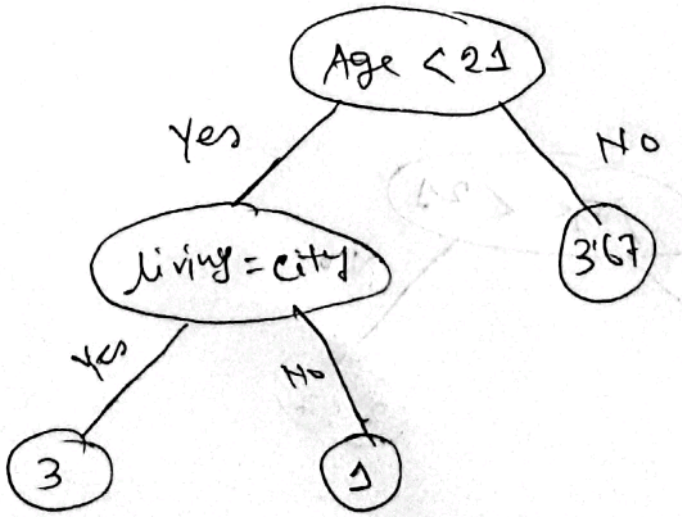


Observation subsetting on age < 21

ID	Age	living village	IQ
1	8		1
2	10	city	3
3	12	village	1

age_averages
9
11

Splitter	left_avg	right_avg	SSR
9	1	2	2
11	2	1	2
city	3	1	0 ← minimum



Observation subsetting on age > 21:

ID	Age	Living village	IQ
4	30		4
5	35	city	5
6	60	city	2

age averages

32.5

47.5

Splitter	left_avg	right avg	SSR	
32.5	4	3.5	4.5	
47.5	4.5	2	0.5	← minimum
city	3.5	4	4.5