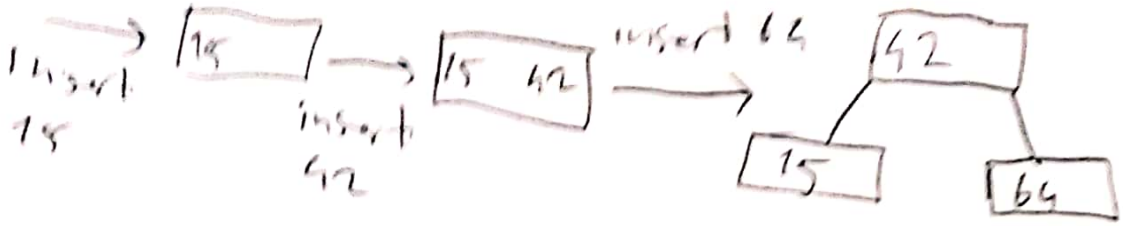
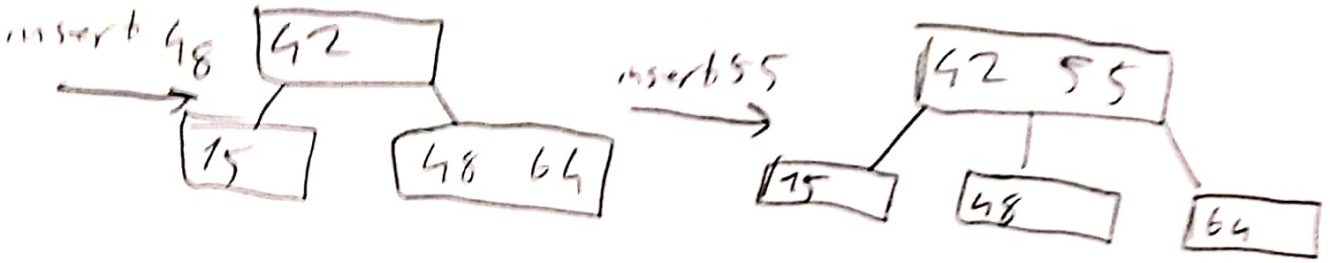
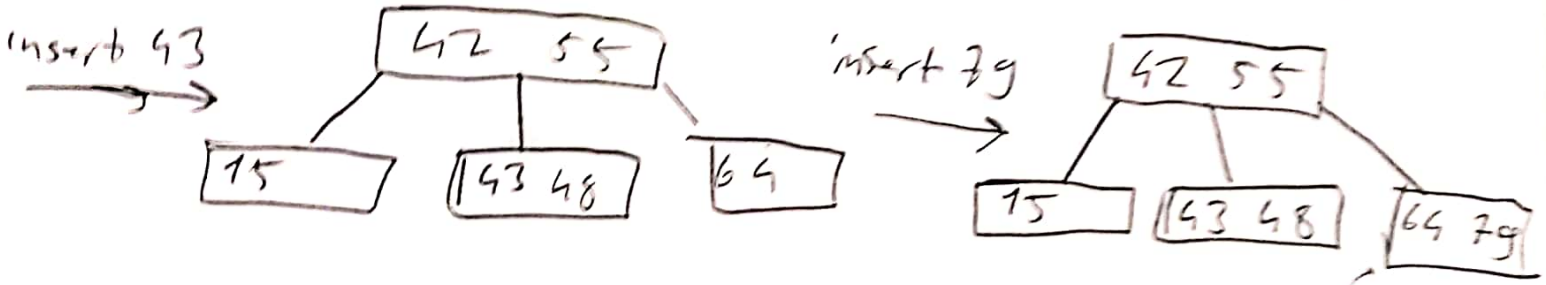
Q1)

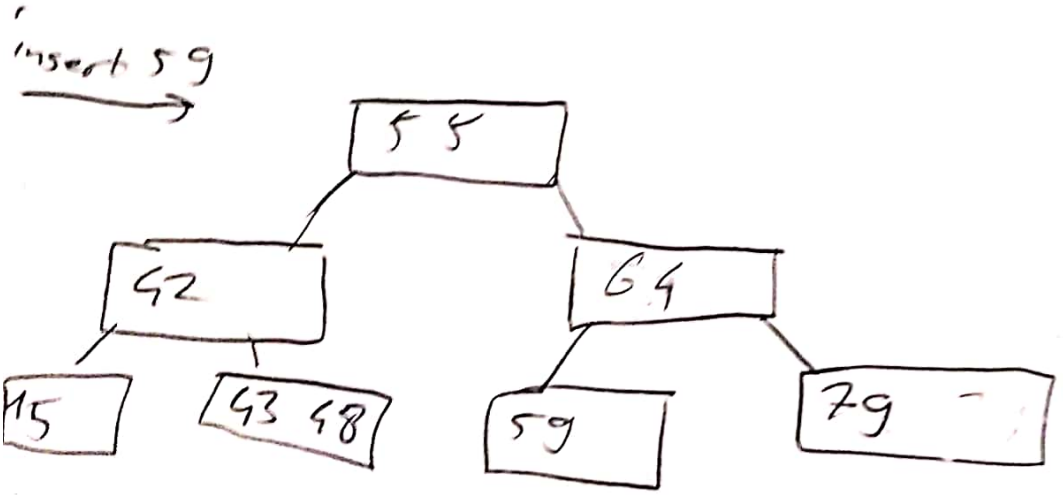
Berdan Akyürek
21600904

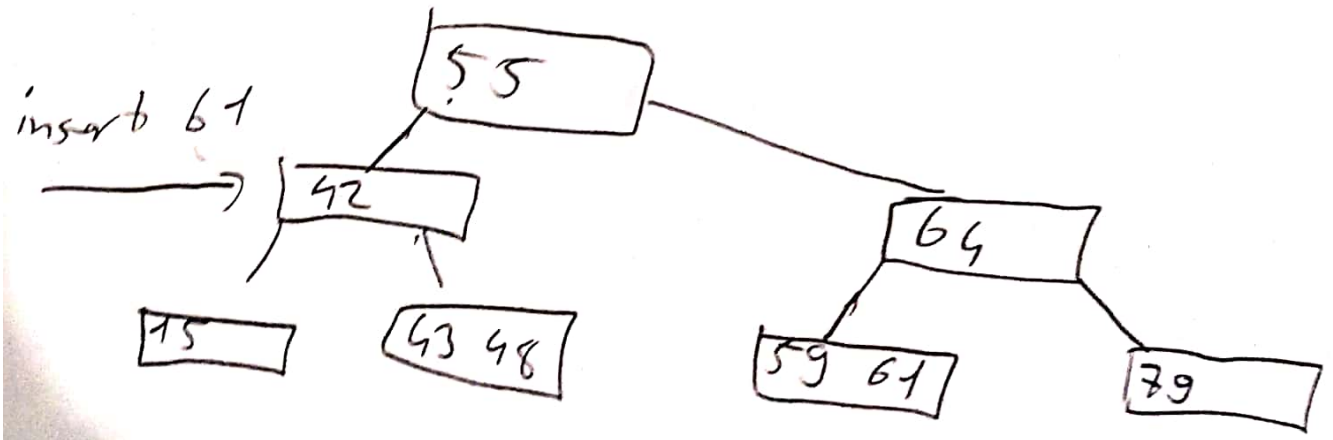
2-3 Tree





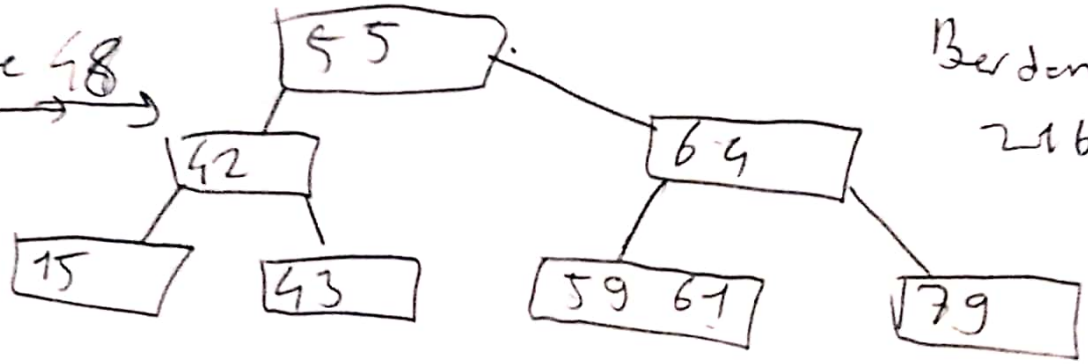




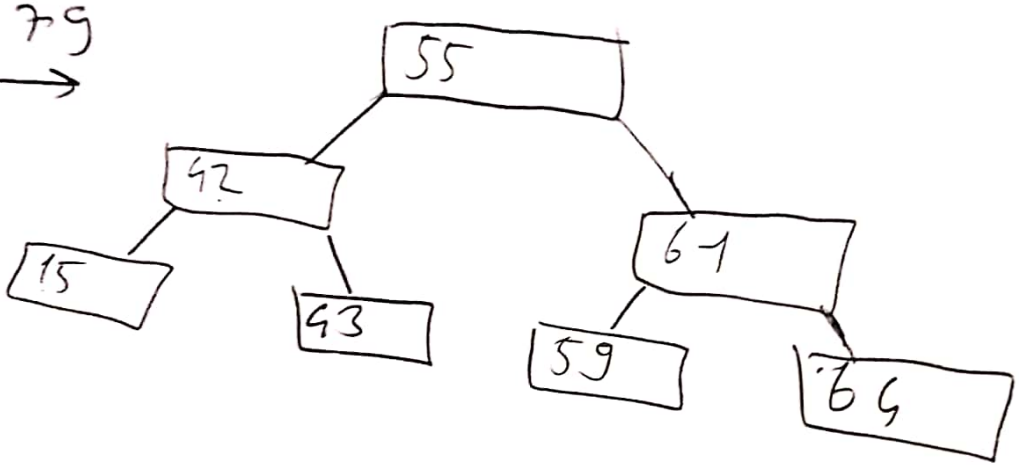


Berdan Akyürek
21600904

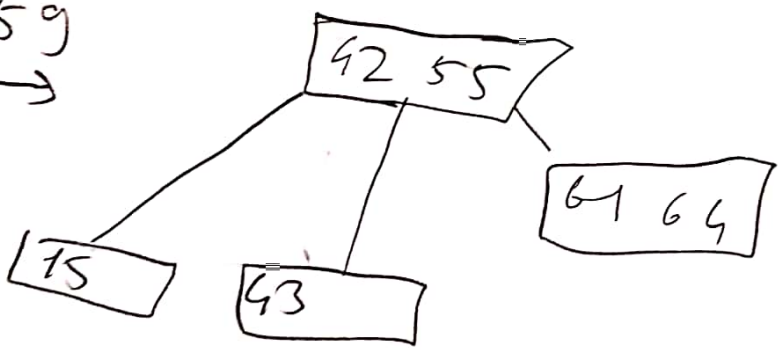
delete 48



delete 79

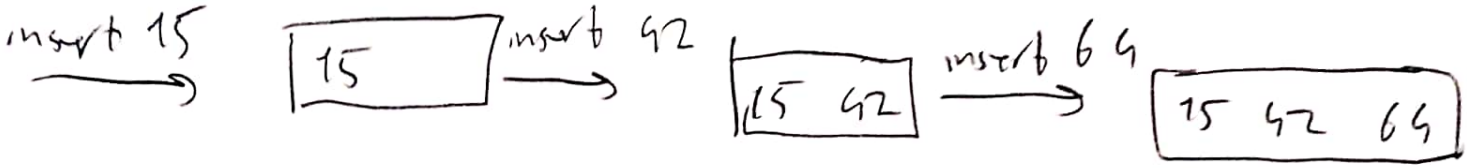


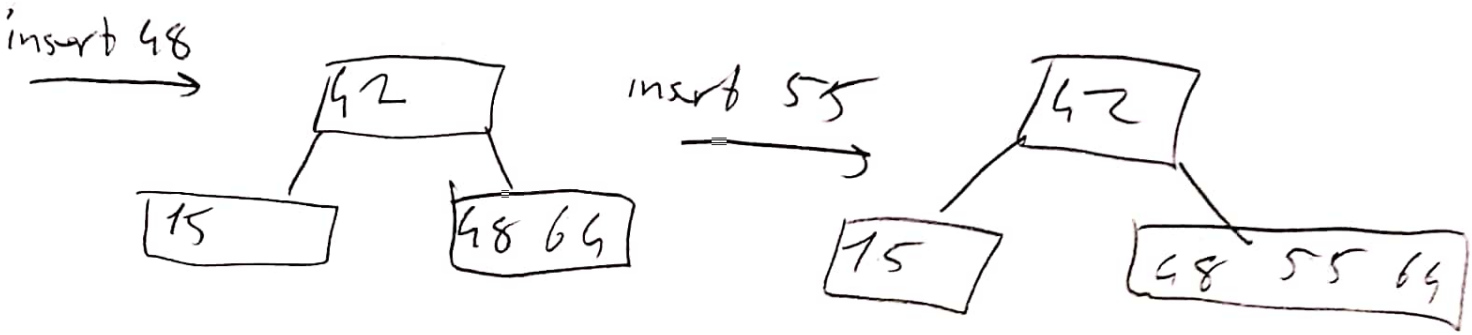
delete 59

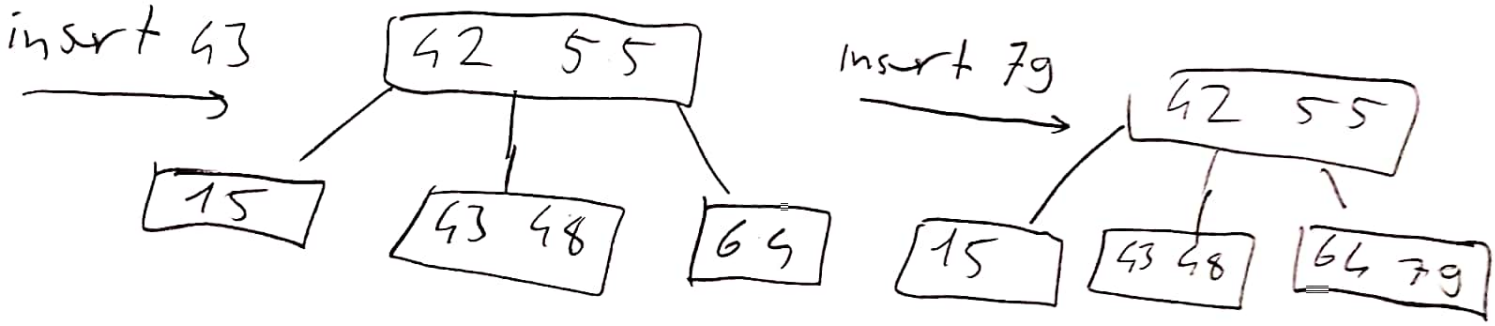


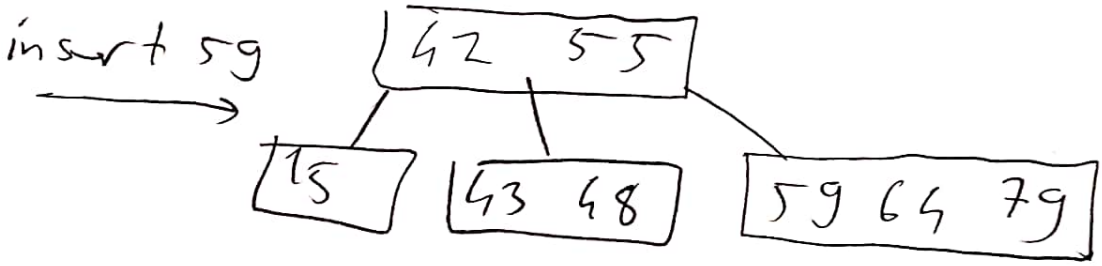
2-3-4 tree

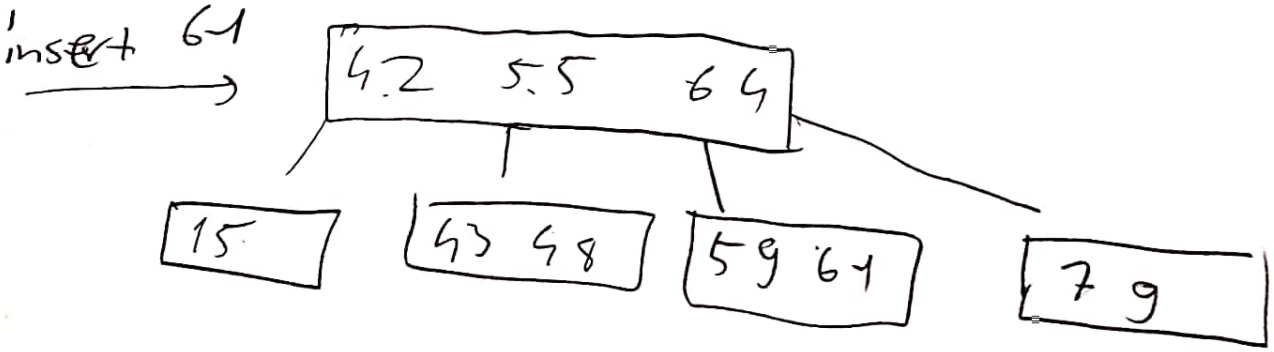
Berdan Akyürek
21600904





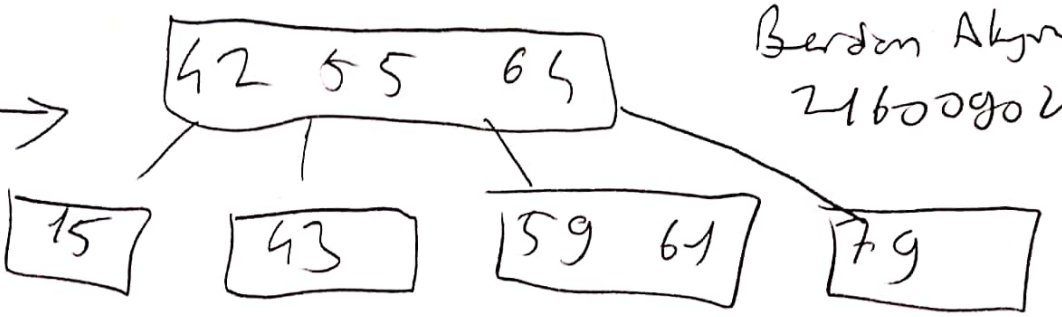




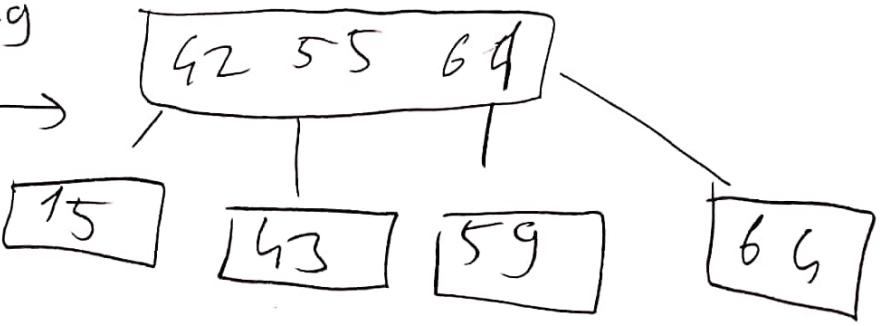


Berdan Akyürek
21600904

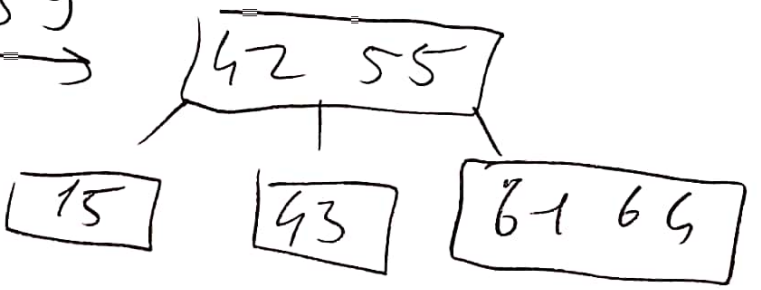
delete 48



delete 79

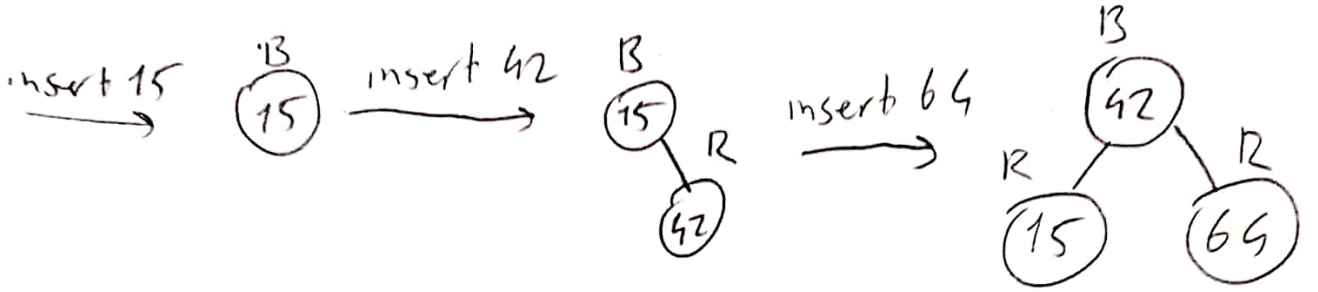


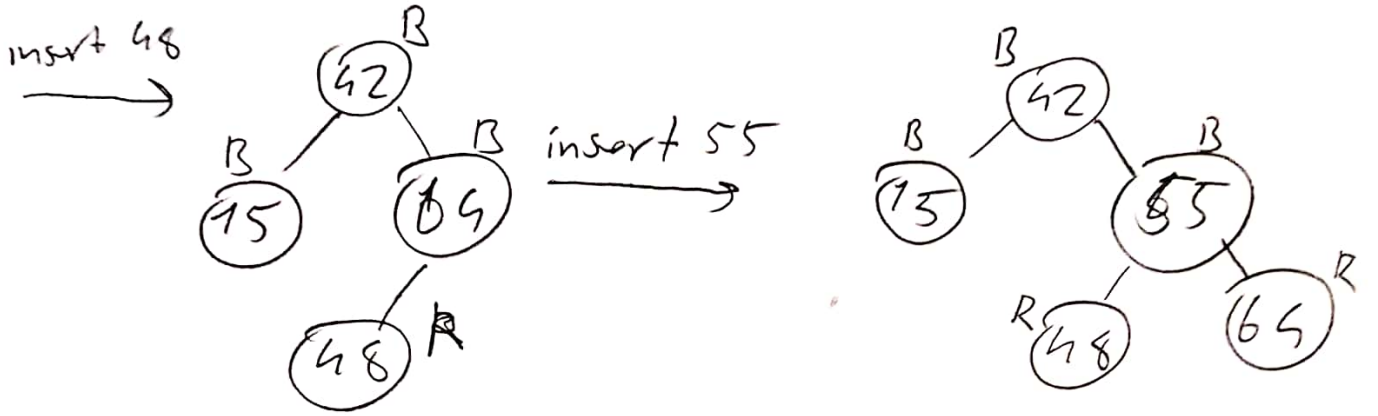
delete 59

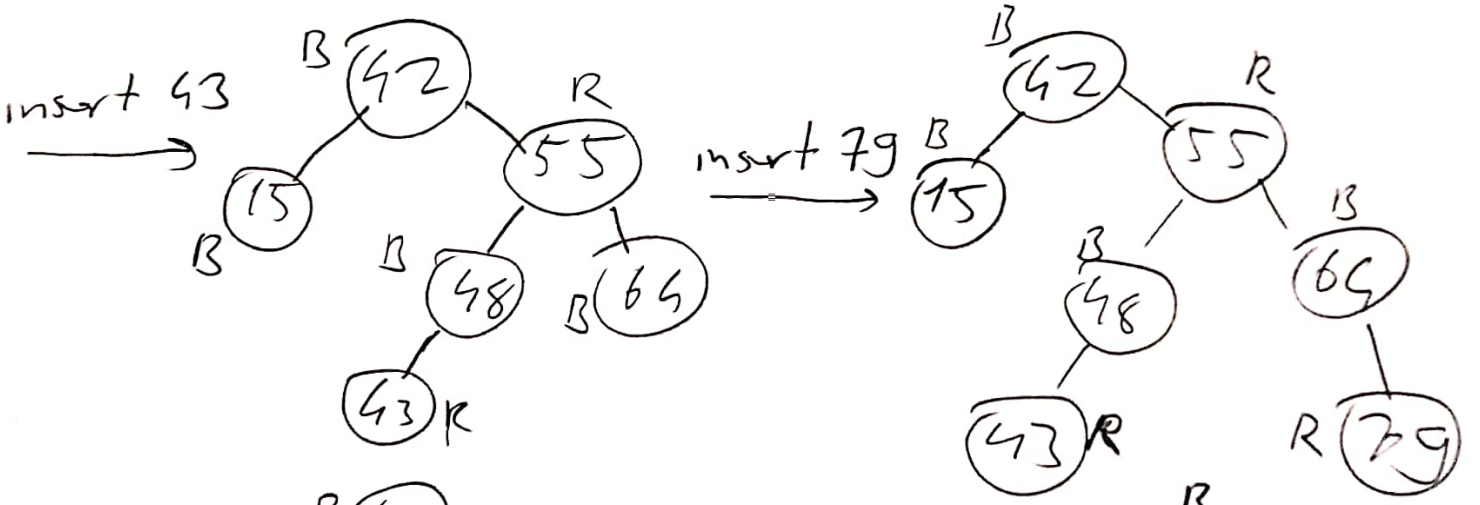


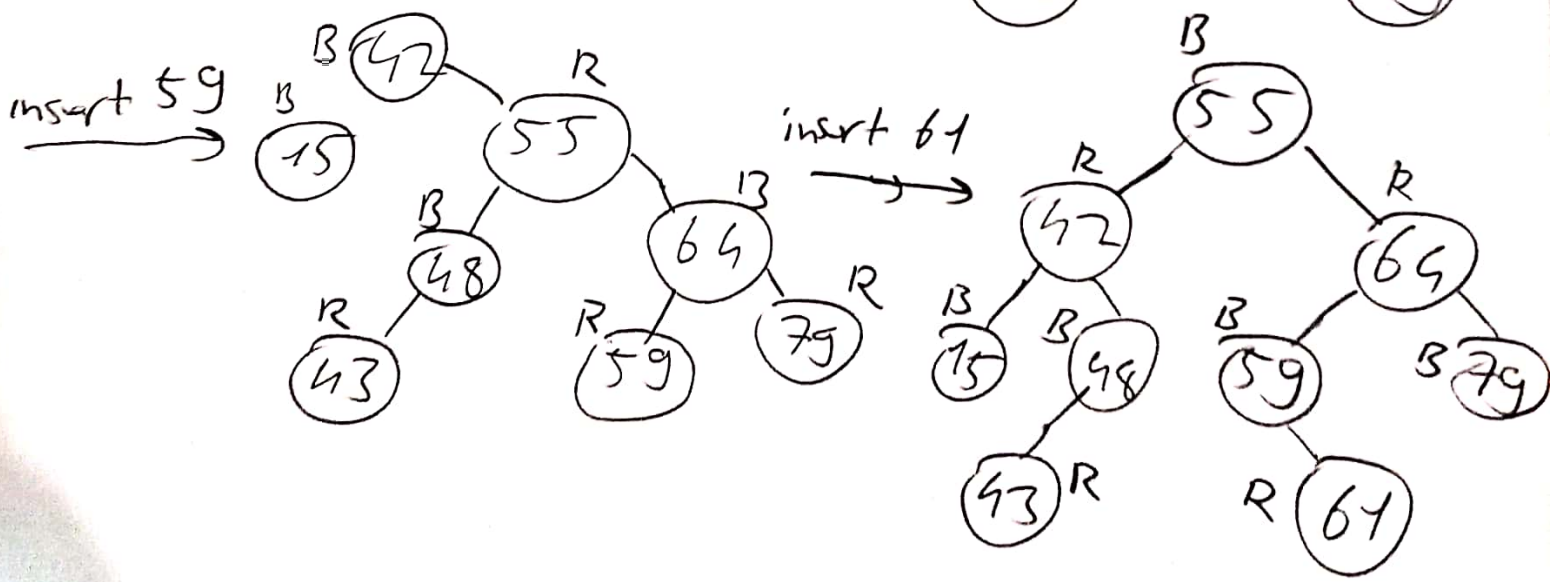
Red Black Tree

Berdan Akyürek
21600904





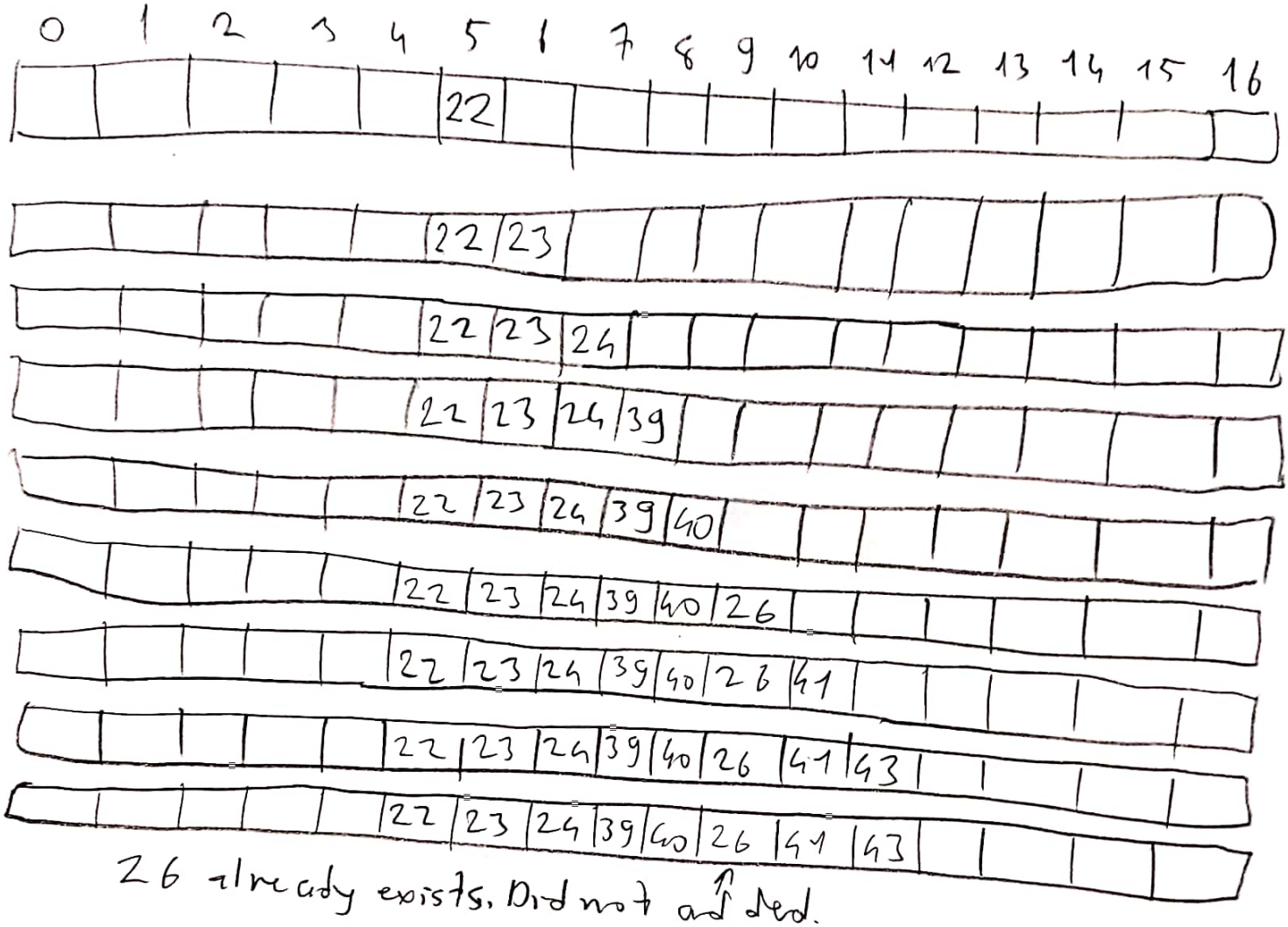




Q2

Berdan Akyürek
21600904

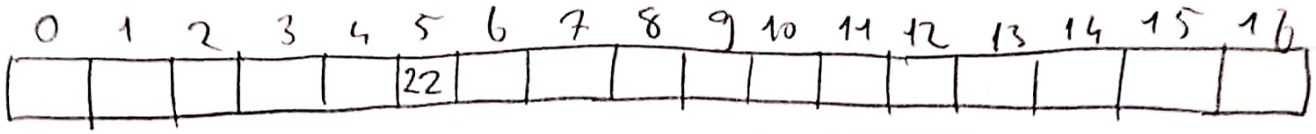
1) open adressing, linear probing

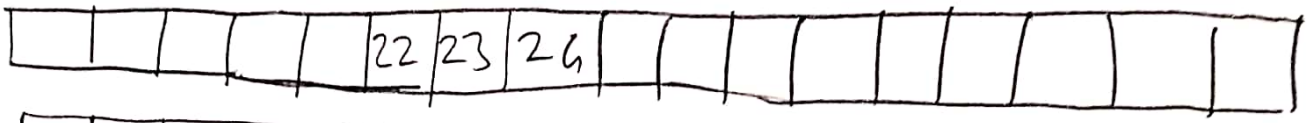


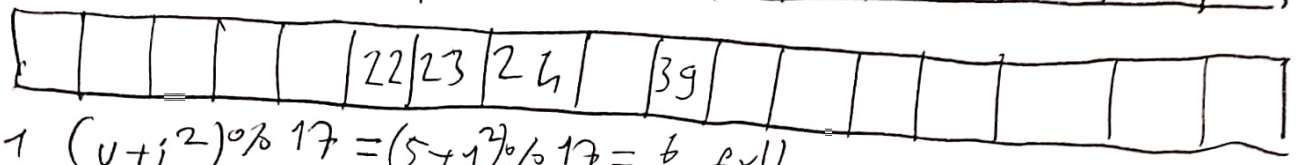
26 already exists. Did not add.

$(v+i^2)\%17$

2) Open addressing, quadratic probing. $5+1^2$

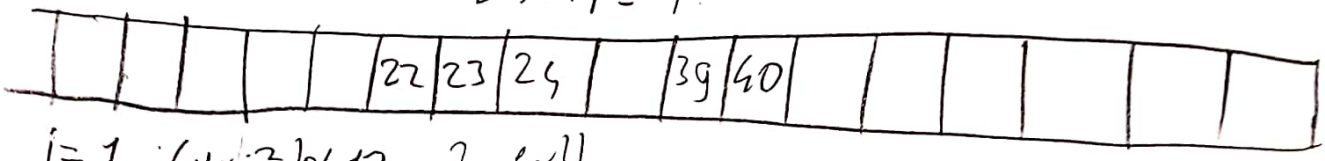






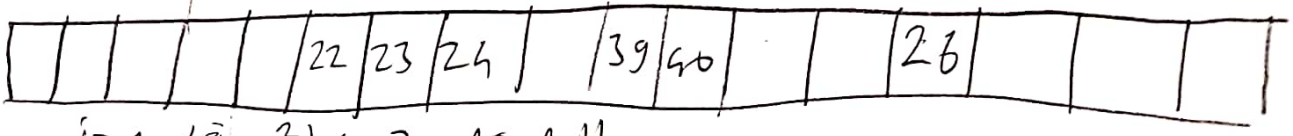
$i=1 \quad (v+i^2)\%17 = (5+1^2)\%17 = 6$ full

$i=2 \quad 5+2^2\%17 = 9$



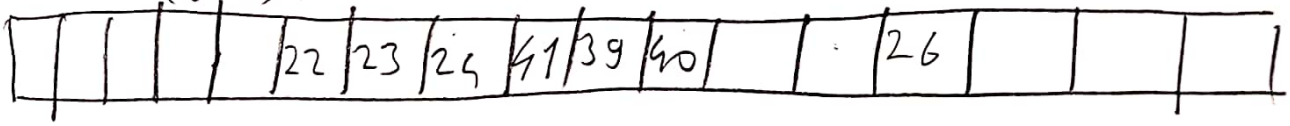
$i=1 \quad (v+i^2)\%17 = 7$ full

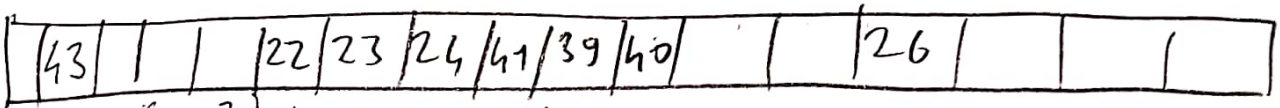
$v \quad (8+2^2)\%17 = 10$



$i=1 \quad (9+1^2)\%17 = 10$ full

$i=2 \quad (9+2^2)\%17 = 13$

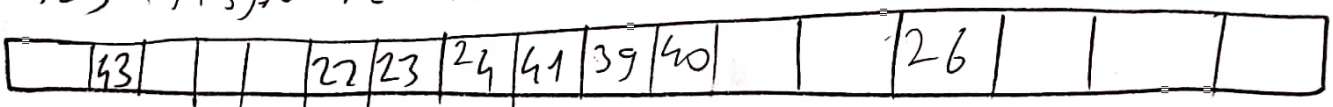




$i=1 \quad (9+1^2)\%17 = 10$ full

$i=2 \quad (9+2^2)\%17 = 13$ full

$i=3 \quad (9+3^2)\%17 = 18\%17 = 1$



$i=1 \quad (9+1)^2\%17 = 10$ full

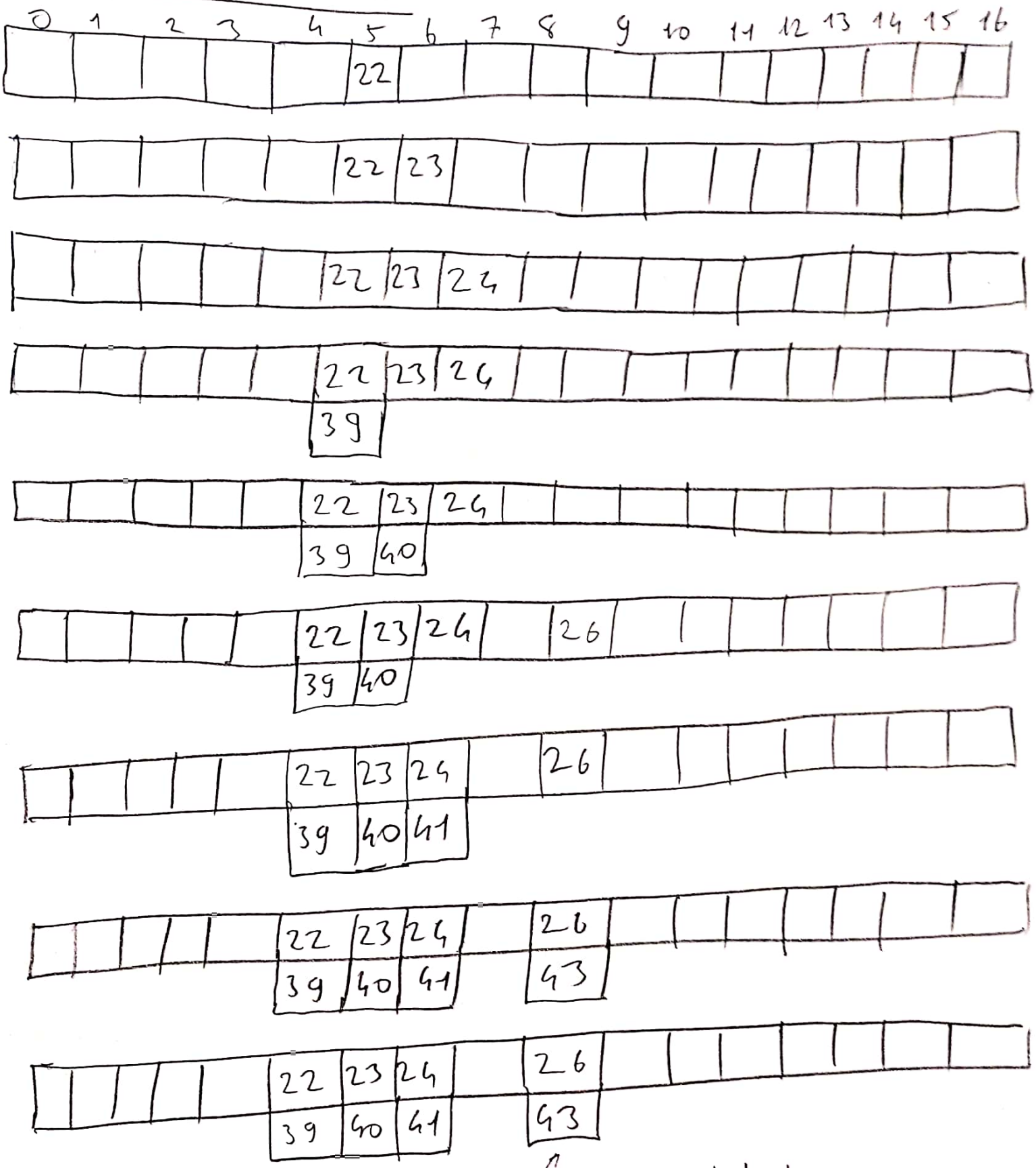
$i=2 \quad (9+2^2)\%17 = 13$. Value already exists. Will not add.

Berdan Akyürek

21600904

7

3) Separate Chaining



Value already exist. Will not be added.

Berdan Akyürek
21600904