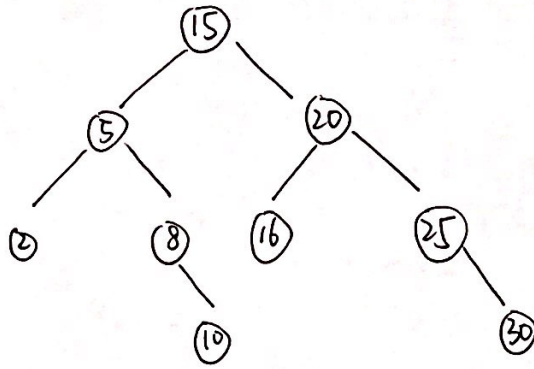
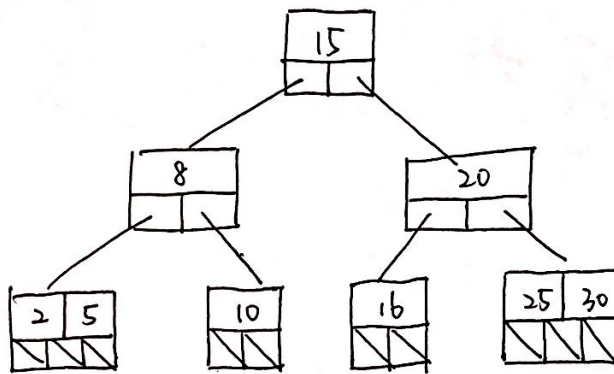


# Binary Search Tree

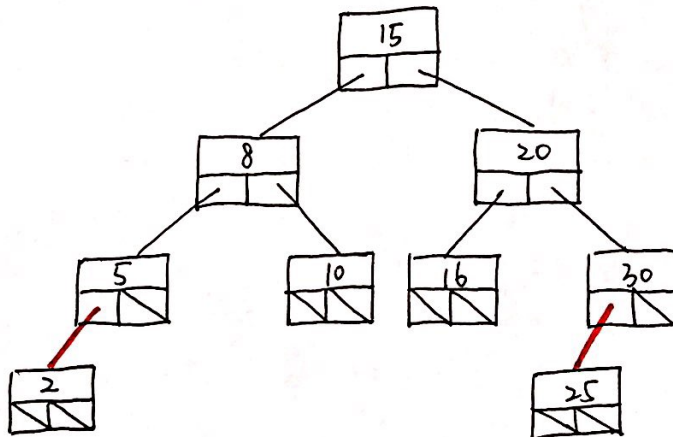
Larinta Wang  
# 1473704



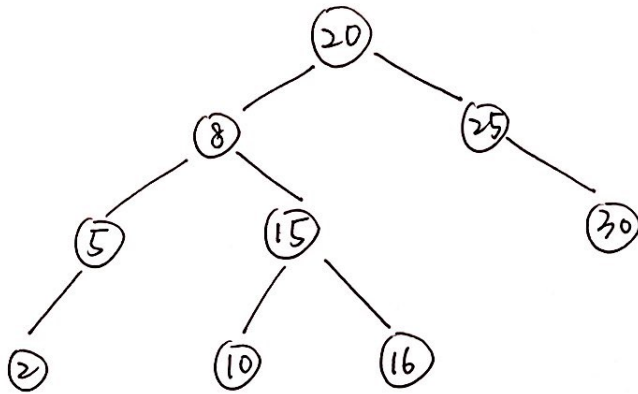
## 2-3 Tree



## Left-leaning Red Black Tree



# AVL Tree



String		Hash Function	Hashcode	Index
"hello"	$104 \times 31^4 + 101 \times 31^3 + 108 \times 31^2 + 108 \times 31^1 + 111 \times 31^0$	$99162322 \bmod 31$	18	0
"hELLO"	$104 \times 31^4 + 69 \times 31^3 + 108 \times 31^2 + 108 \times 31^1 + 111 \times 31^0$	$98209010 \bmod 31$	18	1
"heLlo"	$104 \times 31^4 + 101 \times 31^3 + 76 \times 31^2 + 108 \times 31^1 + 111 \times 31^0$	$99131570 \bmod 31$	18	2
"heLLo"	$104 \times 31^4 + 101 \times 31^3 + 108 \times 31^2 + 76 \times 31^1 + 111 \times 31^0$	$99161330 \bmod 31$	18	3
"HeLlO"	$72 \times 31^4 + 101 \times 31^3 + 108 \times 31^2 + 108 \times 31^1 + 79 \times 31^0$	$69609618 \bmod 31$	17	4
"hELL0"	$104 \times 31^4 + 69 \times 31^3 + 76 \times 31^2 + 76 \times 31^1 + 79 \times 31^0$	$98177234 \bmod 31$	17	5
"HeLL0"	$72 \times 31^4 + 101 \times 31^3 + 76 \times 31^2 + 76 \times 31^1 + 79 \times 31^0$	$69577874 \bmod 31$	17	6
"HELlO"	$72 \times 31^4 + 69 \times 31^3 + 108 \times 31^2 + 76 \times 31^1 + 79 \times 31^0$	$68655314 \bmod 31$	17	7
"HELlO"	$72 \times 31^4 + 69 \times 31^3 + 76 \times 31^2 + 108 \times 31^1 + 79 \times 31^0$	$68625554 \bmod 31$	17	8
"heLL0"	$104 \times 31^4 + 69 \times 31^3 + 76 \times 31^2 + 76 \times 31^1 + 111 \times 31^0$	$98177266 \bmod 31$	18	9

Number of collisions : 8  
 18 appeared 5 times and 17 appeared 5 times.