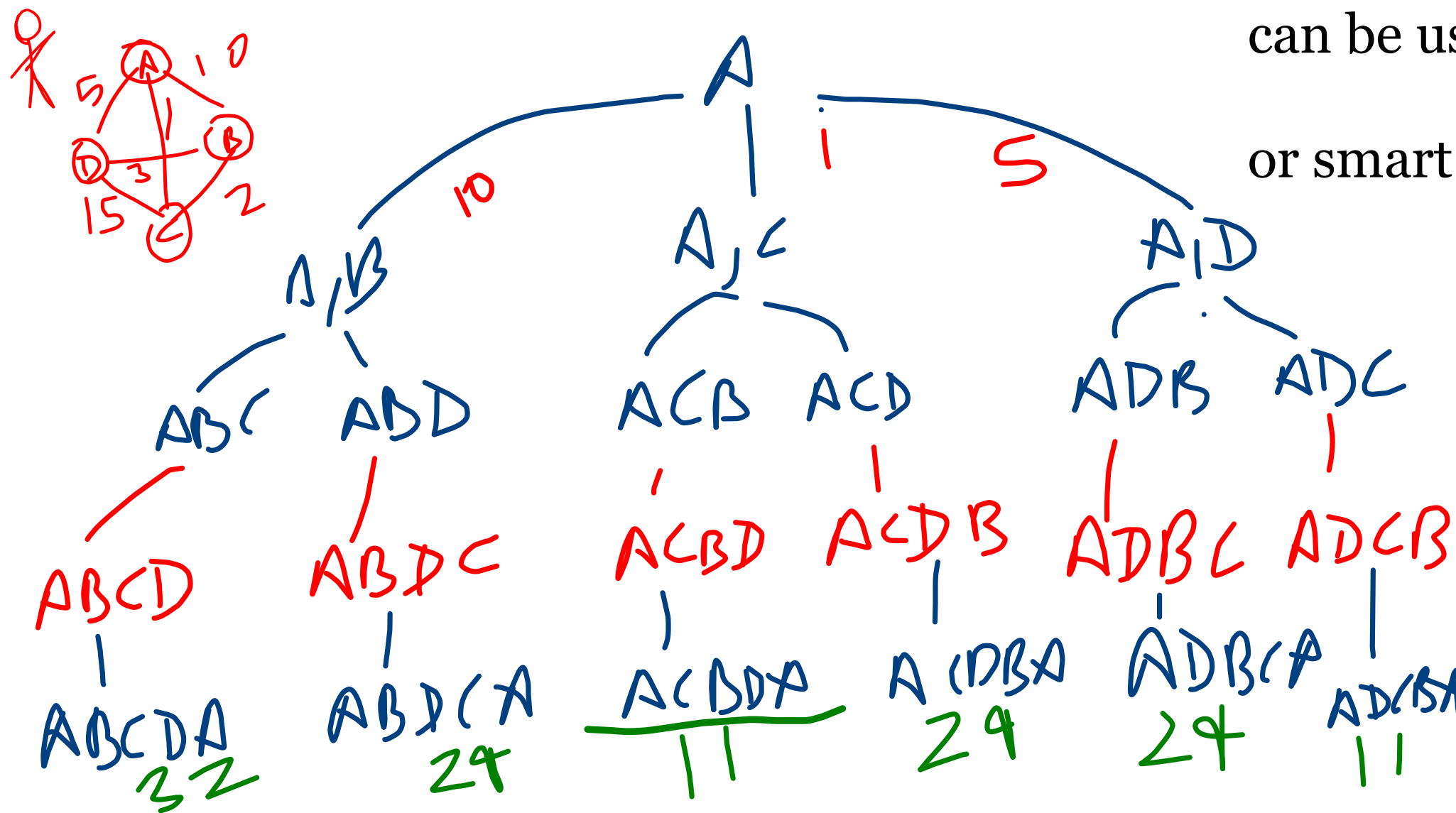


can be used with blind  
or smart search/LC search



TSP:  
goal: travel from source to source  
via each city in minimum cost/time.

$$O(n^2)$$

:

$$T(n) = T(n-1) + T(1)$$

$$T(n-1) = T(n-2) + T(1)$$

$$T(n) = T(n-1) + T(n-2) + T(n-3) + \dots + T(1)$$

sum of series formula:  $n(n-1)/2$

$$O(n^2)/2 - O(n/2)$$

$$O(n^2) - O(n)$$

$$O(n^2)$$

$$O(n \log n)$$

$$T(n) = 2T(n/2)$$

$$T(n/2) = 2T(n/4)$$

.

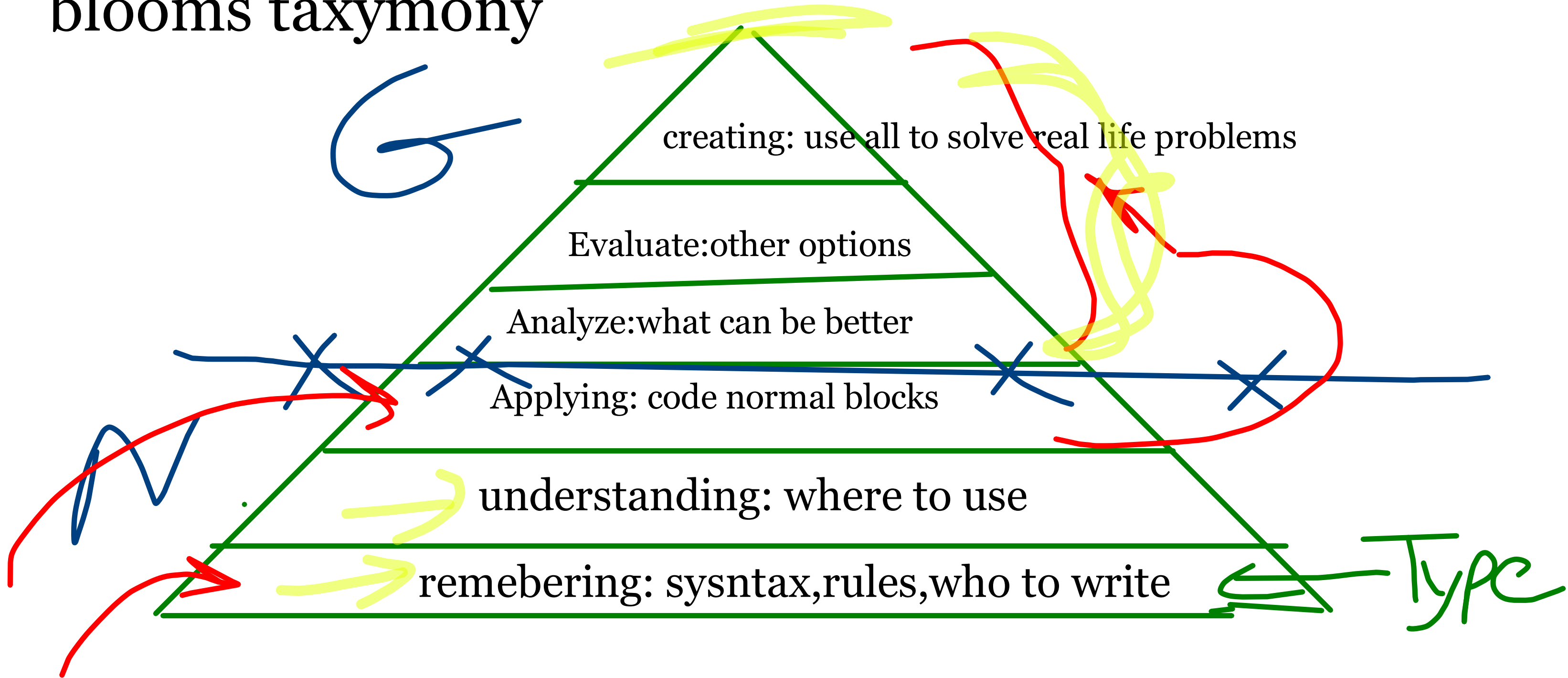
.

$$T(n) = 2T(n/2) + 4T(n/4) + 8T(n/8) \dots + nT(1)$$

$n/2 \dots n/4 \dots n/8 \dots \rightarrow$  Log series    Log  $n$

$n$  part of series  $O(n \log n)$

# blooms taxonomy



## 5. Maximum Subarray

- **Problem:** Find the contiguous subarray with the largest sum within a given array.
- **Example:**

- Input: `array = [-2, 1, -3, 4, -1, 2, 1, -5, 4]`

- Output: `6`

- Explanation: The subarray `[4, -1, 2, 1]` has the largest sum of 6.

## 6. Maximum Product Subarray

Study:

morning  
afternoon  
night

Way to learn:

hear? 10-15%  
see? 30%  
code? 55%

Applications:

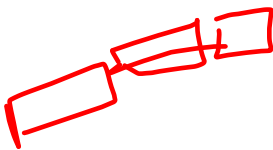
theory:

Stack:  
string rev,dec to bin,expression conversion,evaluation,balance/wellness of {},undo/redo

Queue:  
message oriented comm,streaming,data pipe,sync

Linked List:

Linear:  
data management(CURD)  
polynomial addition  
in games for progress  
in kinematics of player  
data supply chain

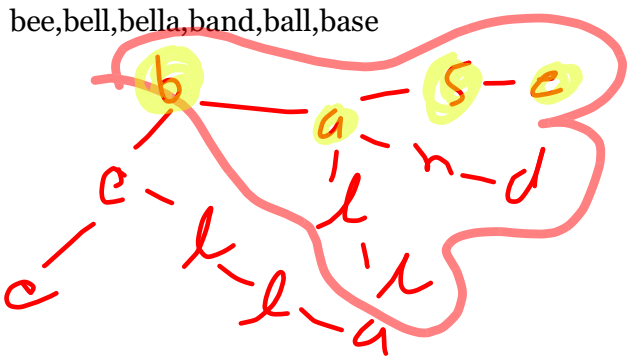


Circular:

Filteration,  
play list  
digital music

Doubly Linked List  
tree implementation

Tree:  
-searching sorting large scale data  
-auto complete  
-auto correct  
-in GIS(Geographical Info System)  
-storage hierarchy  
-show hierarchical strucutre



ba

bsae

base

Graph:  
routing,security,search,topological sort,social media,navigation

Stack:

2 stack in one

reversal dec to bin

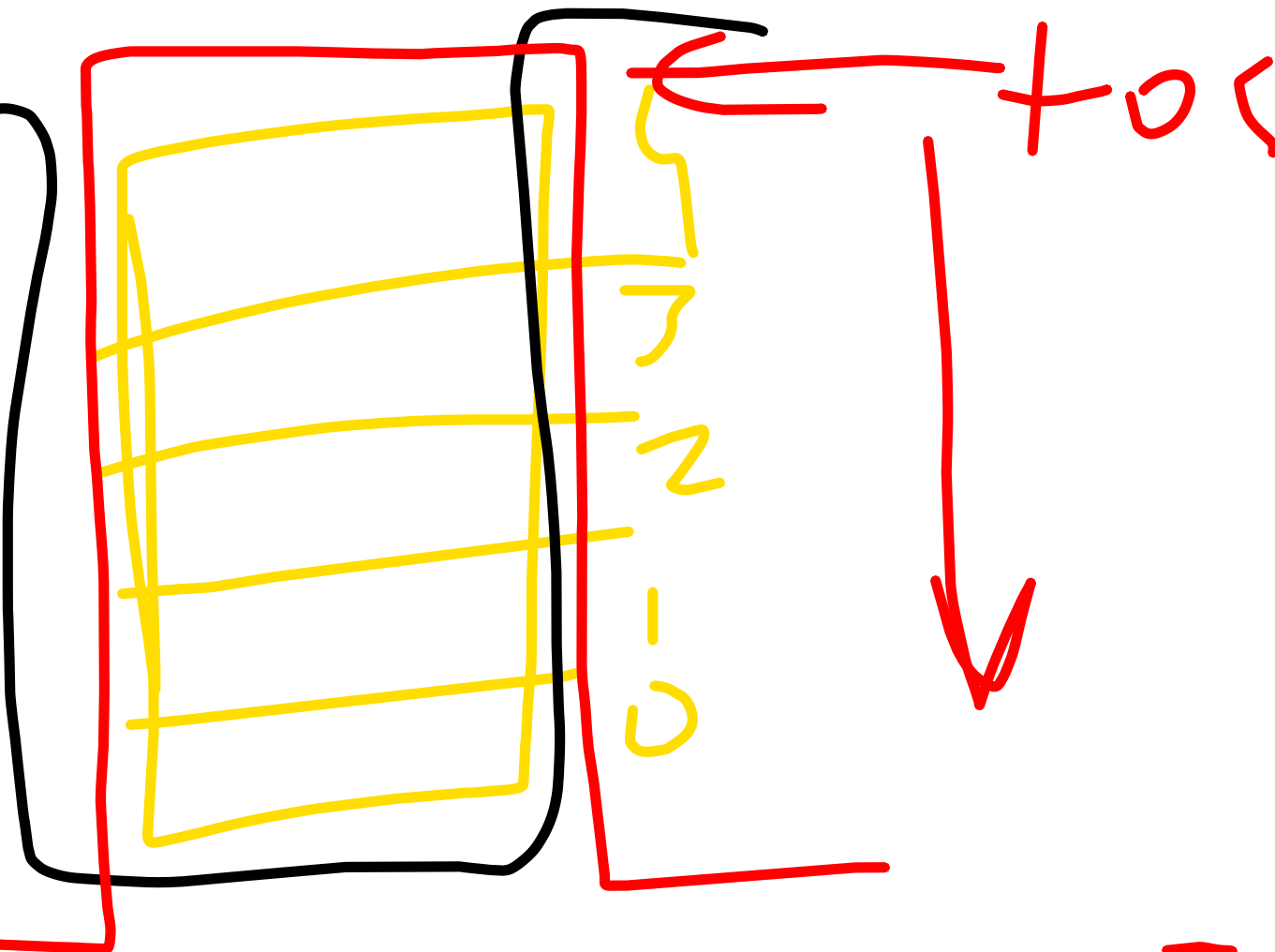
infix to pre/post

min stack\*\*

max stack\*\*

} gets max/min  
on stack  
a pass

tos



push(10)

(5)	23
(15)	12
(20)	20
(12)	15
(23)	5
	10

23
20
15
10

max

pop(): 23 23 23  
( ): 12  
( ): 20 20



Queue:  
normal,  
sliding window min/max  
binary to dec conversion

W	0	5	8	2	1	1	6	3	4	7
---	---	---	---	---	---	---	---	---	---	---

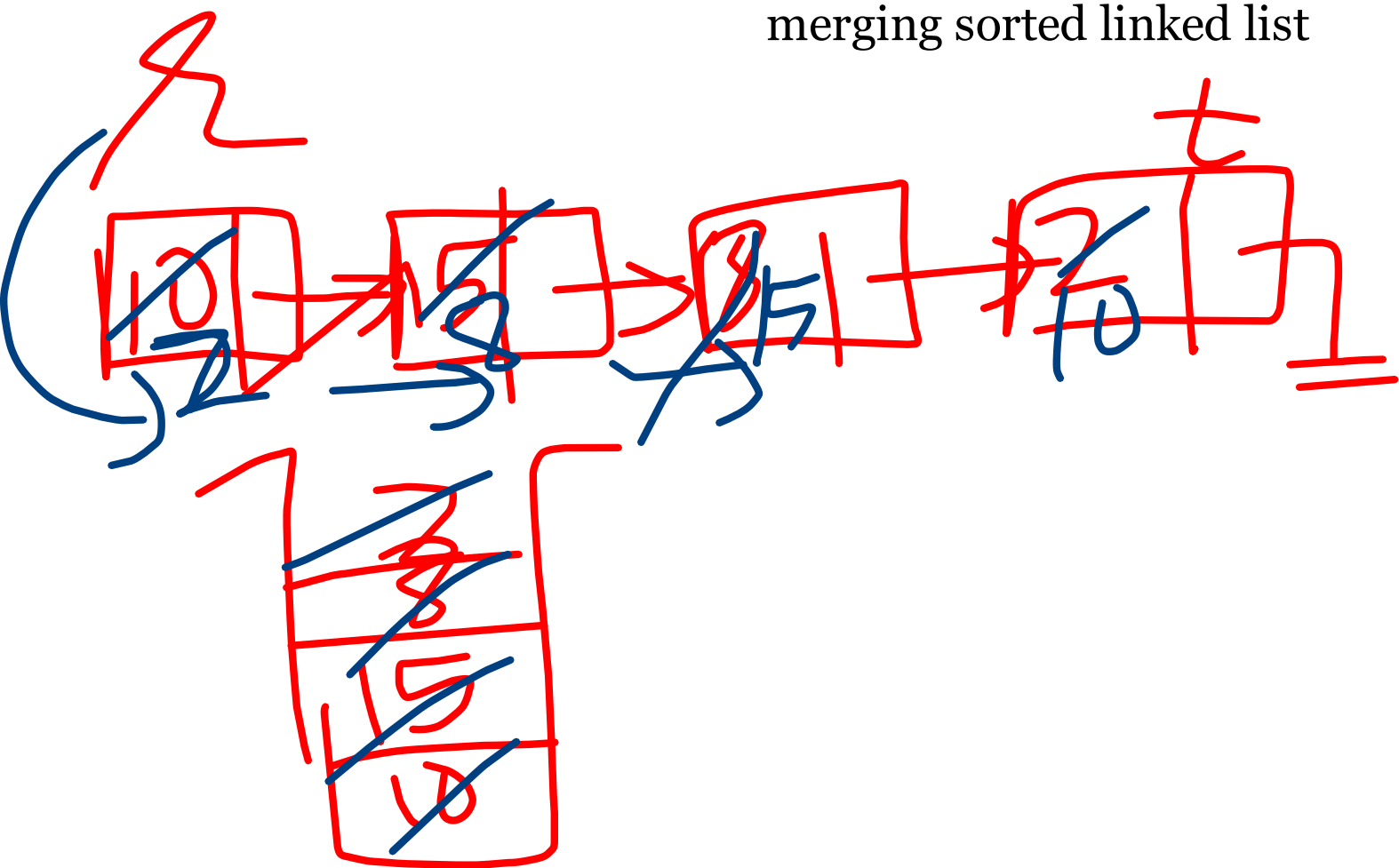
5 2 1 1 1 3 3

$(1010) \rightarrow \text{Dec}$

$$1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$

8 0 2 0

Linked List  
ADT  
sorting linked list  
polynomial addition  
reversing linked list using stack  
merging sorted linked list



Handwritten polynomial addition showing the sum of  $3x^2 + 5x + 2$  and  $7x^3 + 2x^2 + 5$ . The result is  $7x^3 + 5x^2 + 5x$ .

Diagram illustrating a linked list structure with four nodes. The nodes contain values 10, 15, 5, and 7. A stack is shown below the list, containing the values 7, 5, and 10, representing the reversal of the list. Blue arrows indicate the reversal process.

Tree:

adt

check balance, sort  $n$  numbers using tree,

check for duplicates in tree

check mirror or not

Graph:

BFS

DFS

celebrity in graph

indegree ( $v-1$ ) out degree 0