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|  | **Skip List** | **Red Black Trees** | **Dynamic Programming**  **Rod Cutting** |
| **Who** | William Worthingon Pugh Jr.  “Bill” Pugh | Rudolf Bayer | Richard Bellman |
| **When** | 1989 | 1972 | 1950s |
| **What** | In computer science, a skip list is a probabilistic data structure that can get the best features of a sorted array (for searching) while maintaining a linked list-like structure that allows insertion, which is not possible with a static array. | is a self-balancing binary search tree in which each node contains an extra bit for denoting the color of the node, either red or black.  Can be used as a scheduler in Linux, also as a hashmap. | Breaking down an optimization problem (usually recursive) into simpler sub-problems, and storing the solution to each sub-problem so each sub-problem is solved only once. |
| **Properties** | * Randomized Balancing * Sorted Keys * O (log n) levels | * Self-balancing * Sorted Keys * Colored Nodes   Root = Black  Leaf = Black (NULL)  Red Node = Black Child  Depth = Count Black  New Node = Red | * **Memoization** is storing of answers to previously solved subproblems. * Basically recursion |

**TIME AND SPACE COMPLEXITY**

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| **Time Complexity** | | | | | |
|  | **Skip List** | | **Red Black Tree** | | **Rod Cutting** | |
|  | **Average** | **Average** | **Amortized** | **Worst** | **Average** | |
| **Access** | O (log n) | O (log n) | O (log n) | O (log n) | O(n2) | |
| **Search** | O (log n) |
| **Insertion** | O (1) |
| **Deletion** | O (1) |

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| **Space Complexity** | | | |
|  | **Skip List** | **Red Black Tree** | **Rod Cutting** | |
| **Worst** | O (n log n) | O (n) | O(n2) + O(n) | |