Leetcode ② → Zigzag Traversal of BST (LAB ②) 9/8/24

```
int **zigzagLevelOrder(struct TreeNode *root, int *returnSize,
                       int **returnColumnSizes){

    int **ans = malloc(2000*sizeof(int*));
    *returnColumnSizes = malloc(2000*sizeof(int));
    *returnSize = 0;
    struct TreeNode *tmp[2000] = {0};
    int top = -1, start = 0;
    tmp[++top] = root;
    while(tmp[start])
    {
        int tmp_top = top;
        ans[(*returnSize)] = malloc((top - start + 1)*sizeof(int));
        (*returnColumnSizes)[(*returnSize)] = (top - start + 1);
        int idx = (*returnSize)%2 ? (top - start + 1) - 1 : 0;
        int step = (*returnSize)%2 ? -1 : 1;
        while(start <= tmp_top)
        {
            ans[(*returnSize)][idx] = tmp[start]->val;
            if(tmp[start]->left)
                tmp[++top] = tmp[start]->left;
            if(tmp[start]->right)
                tmp[++top] = tmp[start]->right;
            start++;
            idx = idx + step;
        }
        (*returnSize)++;
    }
    return ans;
}
```

Output:

root = [3, 9, 20, null, null, 15, 7]

⇒ [[3], [20, 9], [15, 7]]

root = [1]

⇒ [[1]]

root = []

⇒ []

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