

Algorithm

Algorithm

마방진 (Magic Square)

- 홀수만 처리 가능!

```
int size = 5;

int[][] arr = new int[size][size];
int middle = size/2;

int i=0, j=middle;
for(int num=1 ; num<=size*size ; num++) {
    arr[i][j] = num;
    //행 감소
    i--;
    if(i < 0)
        i = size-1;
    //열 증가
    j = (++j)%size;
    //아래 표현과 같다.
    /*j++;
    if(j >= size)
        j = 0;*/

    //배수이면 행은 1 증가, 열은 그대로
    if(num%size == 0) {
        i = (i+2)%size;
        j--;
        if(j < 0)
            j = size-1;
    }
}
```

합병 정렬 (Merge Sort)

Merge Sort

이진 탐색 (Binary Search)

- $A < X \leq B$ 조건을 검색.

```
// A < X <= B
```

```
public static int binarySearch(int[] arr, int target) {
    if(arr[arr.length - 1] < target)
        return arr.length - 1;
    int left = 0;
    int right = arr.length;

    int result = -1;
    while (left <= right) {
        int mid = (left + right) / 2;

        if (mid > 0) {
            int limit = arr[mid];
            if (arr[mid - 1] <= target && target <= limit) {
                //A < X <= B
                if(arr[mid] == target) {
                    if(mid >= arr.length - 1) {
                        result = mid;
                    }
                    else {
                        result = mid + 1;
                    }
                }
                else
                    result = mid;
                break;
            }
            else if(target > limit)
                left = mid + 1;
            else if(target < limit)
                right = mid - 1;
        }
        else {
            //첫번째 index보다 작은 값일 때
            result = 0;
            break;
        }
    }
    return result;
}
```

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