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 ⇐ 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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