

MERGE Sort - Part 1 : MERGE

$V = \begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \\ 3 & 5 & 6 & 0 & 4 & 7 \end{bmatrix} \Rightarrow [0 \ 3 \ 4 \ 5 \ 6 \ 7]$
MERGE

$E = \begin{bmatrix} 3 & 5 & 6 & \infty \\ \uparrow & \uparrow & \uparrow & \uparrow \\ D = \begin{bmatrix} 0 & 4 & 7 & \infty \\ \uparrow & \uparrow & \uparrow & \uparrow \end{bmatrix} \\ V = \begin{bmatrix} 0 & 3 & 4 & 5 & 6 & 7 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \end{bmatrix}$

$E = \begin{bmatrix} 3 & 5 & 6 & \infty \\ \uparrow & \uparrow & \uparrow & \uparrow \\ D = \begin{bmatrix} 0 & 4 & 7 & \infty \\ \uparrow & \uparrow & \uparrow & \uparrow \end{bmatrix} \\ V = \begin{bmatrix} 0 & 3 & 4 & 5 & 6 & 7 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \end{bmatrix}$

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VOID MERGE(INT *V, INT P, INT Q, INT R) {
    INT *E, *D;
    INT L, J, K;
    INT n1 = Q - P + 1;
    INT n2 = R - Q;
    E = MALLOC(sizeof(INT) * (n1 + 1));
    D = MALLOC(sizeof(INT) * (n2 + 1));
    FOR (i = 0; i < n1; i++)
        E[i] = V[P + i];
    E[n1] = INT_MAX;
    FOR (j = 0; j < n2; j++)
        D[j] = V[Q + 1 + j];
    D[n2] = INT_MAX;
    i = 0;
    j = 0;
    FOR (k = P; k <= R; k++) {
        IF (E[i] <= D[j])
            V[k] = E[i];
            i++;
        ELSE
            V[k] = D[j];
            j++;
    }
    FREE(E);
    FREE(D);
}
```

$q+1 \rightarrow r$
 $r - (q+1) + 1$
 $r - q - (1 + 1)$

#INCLUDE <LIMITS.h>