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TOPIC – Divide and conquer algorithms

1. Write a C code to implement Strassen's matrix multiplication.

```
#include <stdio.h>
int main() {
    int z[2][2];
    int i, j;
    int m1, m2, m3, m4, m5, m6, m7;
    int x[2][2] = {
        {12, 34},
        {22, 10}
    };
    int y[2][2] = {
        {3, 4},
        {2, 1}
    };
    printf("The first matrix is:\n");
    for (i = 0; i < 2; i++) {
        printf("\n");
        for (j = 0; j < 2; j++)
            printf("%d\t", x[i][j]);
    }
    printf("\nThe second matrix is:\n");
    for (i = 0; i < 2; i++) {
        printf("\n");
        for (j = 0; j < 2; j++)
            printf("%d\t", y[i][j]);
    }
    m1 = (x[0][0] + x[1][1]) * (y[0][0] + y[1][1]);
    m2 = (x[1][0] + x[1][1]) * y[0][0];
    m3 = x[0][0] * (y[0][1] - y[1][1]);
    m4 = x[1][1] * (y[1][0] - y[0][0]);
    m5 = (x[0][0] + x[0][1]) * y[1][1];
    m6 = (x[1][0] - x[0][0]) * (y[0][0] + y[0][1]);
    m7 = (x[0][1] - x[1][1]) * (y[1][0] + y[1][1]);
    z[0][0] = m1 + m4 - m5 + m7;
    z[0][1] = m3 + m5;
```

```
z[1][0] = m2 + m4;
z[1][1] = m1 - m2 + m3 + m6;
printf("\nThe result matrix is:\n");
for (i = 0; i < 2; i++) {
    printf("\n");
    for (j = 0; j < 2; j++)
        printf("%d\t", z[i][j]);
}
return 0;
}
```