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Pledge: _____*I pledge my honor that I have abided by the Stevens Honor System.*___

Use the Master Theorem to find the complexity of each recurrence relation listed below.

1. $T(n)=T\left(\frac{n}{2}\right)+n^2$

   a = 1, b = 2, d = 2, $1 < 2^2$

   Complexity: _$T(n)\in\theta(n^2)$__

2. $T(n)=4\,T\left(\frac{n}{2}\right)+n^2$

   a = 4, b = 2, d = 2, $4 = 2^2$

   Complexity: __$T(n)\in\theta(n^2\,lg(n))$___

3. $T(n)=3\,T\left(\frac{n}{3}\right)+\sqrt{n}$

   a = 3, b = 3, d = 0.5, $3 > 3^{.5}$, $\theta\left(n^{\log_3(3)}\right)$

   Complexity: __$T(n)\in\theta(n)$__

For each function below, write the recurrence relation for its running time and then use the Master Theorem to find its complexity.

4.
```
int f(int arr[], int n) {
    if (n == 0) {
        return 0;
    }
    int sum = 0;
    for (int j = 0; j < n; ++j) {
        sum += arr[j];
    }
    return f(arr, n / 2) + sum + f(arr, n / 2);
}
```

   Recurrence: __$T(n)=2\,T(\frac{n}{2})+n$____

   a = 2, b = 2, d = 1, $2 = 2^1$

   Complexity: __$T(n)\in\theta(n\,lg(n))$____

5.
```
void g(int n, int arrA[], int arrB[]) {
    if (n == 0) {
        return;
    }
    for (int i = 0; i < n; ++i) {
        for (int j = 0; j < n; ++j) {
            arrB[j] += arrA[i];
        }
    }
    g(n / 2, arrA, arrB);
}
```

Recurrence: _____$T(n)=T(\frac{n}{2})+n^2$_____

a = 1, b =2, d = 2, $1<2^2$

Complexity: __$T(n)\in\theta(n^2)$____