

แบบฝึกหัด

1. ข้อได้ผิด

Big-Oh Examples

$n \in O(n)$?
 $10n \in O(n)$?
 $n \in O(10n)$?
 $n \in O(n^2)$?
 $n^2 \in O(n)$?
 $10n^2 \in O(n^2)$?
 $n \lg n \in O(n^2)$?
 $\ln n \in O(2n)$?
 $\lg n \in O(n)$?
 $3n + 4 \in O(n)$?
 $5n^2 + 10n - 2 \in O(n^3)$? $O(n^2)$? $O(n)$?

Big-Oh Examples

$\sqrt{n} \in O(n)$?
 $\lg n \in O(2^n)$?
 $\lg n \in O(n)$?
 $n \lg n \in O(n)$?
 $n \lg n \in O(n^2)$?
 $\sqrt{n} \in O(\lg n)$?
 $\lg n \in O(\sqrt{n})$?
 $n \lg n \in O(n^{\frac{3}{2}})$?
 $n^3 + n \lg n + n\sqrt{n} \in O(n \lg n)$?
 $n^3 + n \lg n + n\sqrt{n} \in O(n^3)$?
 $n^3 + n \lg n + n\sqrt{n} \in O(n^4)$?

2. Calculating Big-Oh

```
for (i=1; i<n; i=i+2)
    sum++;
```

3. Calculating Big-Oh

```
for (i=1; i<n; i++)
    for (j=1; j < n/2; j++)
        sum++;
```

4. Calculating Big-Oh

```
for (i=1; i<n; i=i*2)
    sum++;
```

5. Calculating Big-Oh

```
for (i=1; i<n; i=i*2)
    sum++;
```

6. Calculating Big-Oh

```
for (i=0; i<n; i++)
    for (j = 0; j < i; j++)
        sum++;
```

7. Calculating Big-Oh

```
sum = 0;
for (i=0; i<n; i++)
    sum++;
for (i=1; i<n; i=i*2)
    sum++;
```

8. Calculating Big-Oh

```
sum = 0;
for (i=0; i<n; i=i+2)
    sum++;
for (i=0; i<n/2; i=i+5)
    sum++;
```

9. Calculating Big-Oh

```
for (i=0; i<n; i++)
    for (j=1; j < n; j=j*2)
        for (k=1; k < n; k=k+2)
            sum++;
```

10. Calculating Big-Oh

```
sum = 0;
for (i=1; i<n; i=i*2)
    for (j=0; j<n; j++)
        sum++;
```

11. Calculating Big-Oh

```
sum = 0;
for (i=1; i<n; i=i*2)
    for (j=0; j<i; j++)
        sum++;
```

12. Calculating Big-Oh

```
for (i=1; i<=n*n; i++)
    for (j=0; j<i; j++)
        sum++;
```

13. Recursive function

```
long power(long x, long n)
if (n == 0)
    return 1;
else
    return x * power(x, n-1);
```

14. Recursive function

```
long power(long x, long n)
if (n==0) return 1;
if (n==1) return x;
if ((n % 2) == 0)
    return power(x*x, n/2);
else
    return power(x*x, n/2) * x;
```

15. Recursive function

```
long power(long x, long n)
if (n==0) return 1;
if (n==1) return x;
if ((n % 2) == 0)
    return power(x,n/2) * power(x,n/2);
else
    return power(x,n/2) * power(x,n/2) * x;
```