

แบบฝึกหัด

1. ข้อใดผิด

Big-Oh Examples

$$\begin{aligned}n &\in O(n) ? \\10n &\in O(n) ? \\n &\in O(10n) ? \\n &\in O(n^2) ? \\n^2 &\in O(n) ? \\10n^2 &\in O(n^2) ? \\n \lg n &\in O(n^2) ? \\\ln n &\in O(2n) ? \\\lg n &\in O(n) ? \\3n + 4 &\in O(n) ? \\5n^2 + 10n - 2 &\in O(n^3) ? O(n^2) ? O(n) ?\end{aligned}$$

Big-Oh Examples

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

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;
```