

Prof George Wolberg

①

Midterm (Part 1: chap 1-3)

Problem 1.1

formula		big-O notation
a) $10n$	→	$O(n)$
b) $2n^2$	→	$O(n^2)$
c) $3 \log(n)$	→	
d) $2n^2 + 10$	→	$O(n^2)$

Problem 1.2

greatest to least time requirements
assuming, n is very large.

$$n^2 \gg 10n + 10,000 \gg 50 \log n \gg 1,000,000.$$

Problem 1.3

The simplest big-O expression will be $O(n^2)$ because the operation is i times which means it will keep iterate and usage the greatest runtime. ~~and~~

Problem 1.4

The answer is D.

Depends on the code, the program may give different output.

① Problem 1.5

B

Problem 1.6

A

Problem 1.7

B

Problem 1.8

A

Problem 1.9

D

Problem 1.10

$$1+2+3+4+5+6+\dots+n$$

$$= \frac{n(n+1)}{2}$$

$$= \frac{n^2+n}{2}$$

$$= O(n^2)$$

Explanation:

The number is keep increasing therefore it is $O(n^2)$, the greatest run time. There is no end of n value.

3

Problem 1.11

B.

Problem 1.12

B

Chapter 2

Problem 2.1

An object is an instance of a class. Class is an: use-defined type or with keyword class. It contains data and functions. Basically, a class is a template for objects.

Problem 2.2

```
throttle quiz; // declare the object  
quiz.shut_off(); // call the function to  
shut off the flow
```

```
cout << quiz.flow() << endl; // print out  
the current flow
```


Problem 2.3

A macro guard is to prevent duplicate inclusion of header files.

```
#ifndef FILE_H
```

```
#define FILE_H
```

```
#endif
```

Do

Problem 2.4

Const reference parameter.

This sentence with program as same as passing by reference and the function ~~can not~~

This sentence with program same as passing by reference. This will only be used if the value needs to be modified, otherwise the value will remain same. Therefore, if the user don't pass by reference, the value won't change.

Problem 2.5

D

Problem 2.6

D

Problem 2.7

C

Problem 2.8

A

Problem 2.9

D

Problem 2.10

C

Chapter 3Problem 3.1

B

Problem 3.2

C

Problem 3.3

D