

# COMP10002 Foundations of Algorithms

## Workshop Week3

Wenbin Cao

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GitHub Repo: <https://github.com/AlanChaw/COMP10002-FoA>

# Recap

## Chapter3 Making Choices

- Relational and Logical Operators
- Selection
  - if ... else... statement
- Switch Statement

## Chapter4 Loops

- for loop
- while loop

## Chapter5 Functions

# Relational and Logical Operators

- Type: int
  - Non-zero - **True**
  - Zero - **False**

Relational Operator	Name	Logical Operator	Name
==	Equal to	&&	and
>	Greater than		or
<	Less than	!	not
!=	Not equal to		
>=	Greater than or equal to		
<=	Less than or equal to		

# Selection

- Example1

```
if (class_size == 50) {  
    printf("Class is now full\n");  
} else {  
    printf("More students can be accepted\n");  
}
```

- Example2

```
int x=3, y=4, z=6;  
if (x>2)  
    if (y>6)  
        z = 7;  
    else  
        z = 8;
```

# Switch Statement

```
switch (month) {  
    case 2:  
        length_of_month = 28 +  
            (year%4==0 && (year%100!=0 || year%400==0));  
        break;  
    case 4:  
    case 6:  
    case 9:  
    case 11:  
        length_of_month = 30;  
        break;  
    default:  
        length_of_month = 31;  
        break;  
}  
printf("month=%2d, length_of_month=%2d\n", month, length_o
```

# "for" loop

- Grammar

```
for (initialize; guard; update){  
    statement  
}
```

- Example

```
for (int i = 0; i < 10; i++){  
    printf("i = %d\n", i);  
}
```

# "while" loop

- Grammar

```
while (guard){  
    statement  
}
```

- Example

```
int i = 0;  
while (i < 10){  
    printf("i = %d\n", i);  
    i++;  
}
```

# Functions



# Discussion

## Exercise 4.1

a.

```
for (int i = 0; i < 20; i = i + 3){  
    printf("%2d\n", i);  
}
```

b.

```
for (i = 1; i < 2000000; i = 2*i){  
    printf("%7d\n", i);  
}
```

c.

```
int sum = 0;
for (i = 1; i < 10; i++){
    sum = sum + i;
    printf("S(%2d) = %2d\n", i, sum);
}
```

d.

```
int i, j;
for (i = 0; i < 8; i++) {
    for (j = i + 1; j < 8; j += 3) {
        printf("i = %d, j = %d\n", i, j);
    }
}
```

e.

```
int i, j;
for (i = 0; i < 8; i++) {
    for (j = i + 1; j < 8; j += 3) {
        if (i + j == 7) {
            break;
        }
        printf("i = %d, j = %d\n", i, j);
    }
}
```

f.

```
int i, j;  
j = 5;  
for (i = 0; i < j; i++) ; {  
    printf("i = %d, j = %d\n", i, j);  
}
```

g.

```
int i, j;  
j = 5;  
for (i = 0; i < j; j++) {  
    printf("i = %d, j = %d\n", i, j);  
}
```

# Discussion

## Exercise 4.2

Given a general construction that shows how any ***do*** statement can be converted into an equivalent ***while*** statement

# Hands On Exercises

## Exercise 4.5

- Hint: ^D means use **Ctrl+D** to jump out of input loop

## Exercise 4.6

## Exercise 4.7

## Exercise 5.6

- Hint: You may require a help function to find the sum all the factors of a number.