Kasetsart University, Sriracha Campus

03603111: Programming Fundamentals I

	**Operand, Operator, and Data Type**	**Lab 2**

Objective:

- Understand the concept of variables
- Understand how to perform arithmetic operations in C
- Understand how to format output

---

1. User-defined Identifiers

Any valid identifier should:

- Consists of **letters (A-Z, a-z), digits (0-9) and underscores (_)**
- **Do not** begin with a **digit**.
- **Is not** a C **reserved** word.
- Should **not be** in a C **standard library**

Exercise 1 From the part of the program below:

```
1  #include<stdio.h>
2  int main()
3  {
4          int XXX;
5  }
```

Change the "XXX" on line 4 to variable names inside Table 1. Then, compile and run the program to see the results. Give the reason if the name is invalid.

Table 1 Variable Names

Name	Valid/Invalid	Describing (If invalid)
@^_^@		
???		
_mckazine		
box_2		
room 3		

rate-time		
cOUNTRY		
wide*height		
do		
widexheight		
600011Class		
while		
Go!!!		

2. Simple C Structure

Exercise 2 From the given code below.

```
1       #include<stdio.h>
2       int main()
3       {
4               printf("Hello World!\n");
5               printf("This is my first program.");
6               printf("\n\tI\'m a programmer.");
7       }
```

What are the results of this program.

Exercise 3 Write a C program to output as following,

```
Welcome to RASE program
There are three students in this program
ID          Name        Age
--”         James       13
\o^o/       Glass       60
(o_0)’      Bourne      30
```

3. Variables and Constants

C variable is a named location in a memory where a program can manipulate the data. This location is used to hold the value of the variable. The value of the C variable may get change in the program. C variable might be belonging to any of the data type like int, float, char etc. **Before using** the variable, it is needed to be **defined.**

Example 1 Define a variable named "distance" with unsigned int type.

```
unsigned int distance;
```

Example 2 Define a constant named "MYCONST" with float type. Then assign 20000.0 as its initial value.

```
const float MYCONST = 20000.0;
```

Exercise 4 Create a new file, then write down the following code.

```
1   #include<stdio.h>
2   int main()
3   {
4       const double PI = 3.1415926535;
5       radius = 12.5;
6       area = PI * radius * radius;
7       printf("Circle area = %f\n", area);
8   }
```

After that, compile and run to see the results. If the program contains any error, identifies the error and describes the cause of the error.

Write down the corrected program.

Exercise 5 The following program contains some error.

```
1   #include<stdio.h>
2   int main()
3   {
4       int f = 1.5;
5       unsigned int i = -20;
6       char c = 'A';
7       printf("f value = %f, i = %d, c = %c\n", f, i, c);
8   }
```

Identifies the error, explain the cause of the error, and how to fix them.

Exercise 6 The following program contains some error.

```
1   #include<stdio.h>
2   int main()
3   {
4       const int b = a + 1;
5       const int d = c + 3;
6       const int c = b + 2;
7       const int a = 1;
8       printf("a + b + c + d = %d", a + b + c + d);
9   }
```

Identify the causes of errors.

How do you fix the error?

4. Arithmetic Expressions

Exercise 7 Given the code as below,

```
1   #include<stdio.h>
2   int main()
3   {
4       int x = 0;
5       printf("1. %d\n", x);
6       printf("2. %d\n",_____(A)_____);
7       printf("3. %d\n", x);
8   }
```

Put down the following command at the (A), then compile and run to see the results, and write the output into the column next to the given command.

Command	Output
++x	
x++	
x--	
--x	

Exercise 8 Given the code as below,

```
1   #include<stdio.h>
2   int main()
3   {
4       printf("My name is : %s\n", "Nisit");
5       printf("My point : %d\n", 10+42+19);
6       printf("Grade : %c\n", 'B');
7       printf("GPA : %f", 2.34);
8   }
```

After that, compile and run. Then write down the results below.

Exercise 9 Given the code as below,

```
1   #include<stdio.h>
2   int main()
3   {
4       double z = 5, y=3;
5       printf("Before z = %f\n", z);
6       _________(A)________;
7       printf("After z = %f\n", z);
8   }
```

Put down the following command at point (A), then compile and run to see the results, and write the output into the column next to the given command.

Command	Output
z += 3	
z -= 2*y	
z*=15/2	
z/=14-4*y	

Exercise 10 Given the code as below,

```
1   #include<stdio.h>
2   int main()
3   {
4     unsigned int width = ___(a)___, height = ___(b)___, area;
5     area = ___(c)___;
6     printf("Area of rectangle with wide = %d and height = %d is
    %d\n",_(d)_,_(e)_,_(f)_);
7   }
```

This program is designed for calculating the rectangle area with preferred width (7) and height (10).

Point	Command
(a)	
(b)	
(c)	
(d)	
(e)	
(f)	