Jiangxi University of Science and Technology

Chapter 3 Processing and Interactive Input

Leture0303 Interactive Input and Formatted Output

THE C PROGRAMMING LANGUAGE

3.3 Interactive Input (交互式输入)

THE C PROGRAMMING LANGUAGE

➢ Program 3.8

```
1.  #include <stdio.h>
2.  int main(){
3.    printf("%f times %f is %f ", 300, 0.05, 300*0.05);
4.    return 0;
5.  }
```

- This program must be rewritten to multiply different numbers
- **scanf()** is used to enter data into a program while it is executing; the value is stored in a variable

3.3 Interactive Input

THE C PROGRAMMING LANGUAGE

- **int scanf(const char *format [, argument]...);**
  - It requires a **control string (控制字符串)** as the first argument inside the function name parentheses.
  - The control string passed to scanf() typically consists of conversion control sequences only
  - scanf() requires that a list of **variable addresses(变量地址)** follow the control string
  - scanf("%d", &num1);

3.3 Interactive Input

- scanf() used to enter data;
- printf() used to display data;

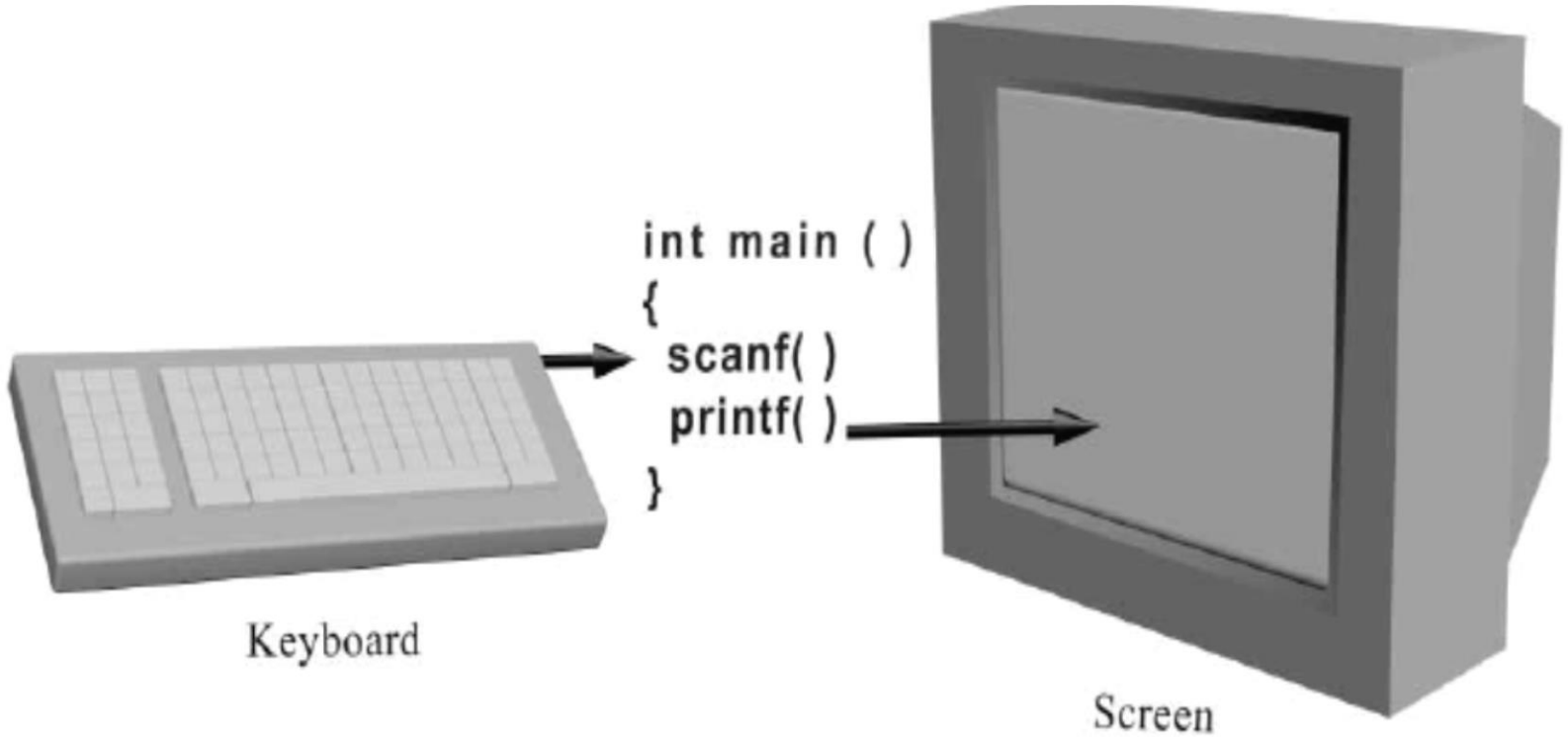

Figure 3.5 `scanf()` used to enter data; `printf()` used to display data

3.3 Interactive Input

- Program 3.9

```
#include <stdio.h>
int main(){
        float num1,num2, product;
        printf("please type in a number: ");
        scanf("%f", &num1);
        printf("please type in another number: ");
        scanf("%f", &num2);
        product=num1*num2;
        printf("%f times %f is %f ",num1, num2, product);
        return 0;
}
```

This statement produces a prompt

Address operator (&)

3.3 Interactive Input

THE C PROGRAMMING LANGUAGE

- **scanf() can be used to enter many values**
  - scanf("%f %f",&num1,&num2);
  - scanf("%f%f",&num1,&num2);
  - scanf("%c%c%c",&ch1,&ch2,&ch3);
  - scanf("%c %c %c",&ch1,&ch2,&ch3);

3.3 Interactive Input

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➢scanf()

- When using scanf(), if a double-precision number is to be entered, you must use the **%lf** conversion control sequence
- scanf() does not test the data type of the values being entered
- In scanf("%d %f", &num1, &num2), if user enters 22.87, 22 is stored in num1 and .87 in num2

3.3 Interactive Input

THE C PROGRAMMING LANGUAGE

- Program 3.10 The Phantom Newline Character

```
#include <stdio.h>
int main(){
        char fkey,skey;
        printf("type in a character: ");
        scanf("%c",&fkey);
        printf("the keystroke just accepted is %d\n",fkey);
        printf("type in another character: ");
        scanf("%c",&skey);
        printf("the keystroke just accepted is %d\n",skey);
        return 0;
}
```

```
scanf("%c%c",&fkey,&skey);
```

C:\Windows\system32\cmd.exe

```
type in a character: m
the keystroke just accepted is 109
type in another character: n
the keystroke just accepted is 110
```

C:\Windows\system32\cmd.exe

```
type in a character: m
the keystroke just accepted is 109
type in another character: the keystroke just accepted is 10
```

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3.3 Interactive Input

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- Program 3.12 A First Look at User-Input Validation

```
1. #include <stdio.h>
2. int main(){
3. int num1,num2, num3,average;
4. printf("enter three integer numbers:");
5. scanf("%d%d%d",&num1,&num2,&num3);
6. average=(num1+num2+num3)/3.0;
7. printf("the average of %d, %d and %d is %d", num1,num2,num3,
   average);
8. return 0;
9. }
```

3.3 Interactive Input

THE C PROGRAMMING LANGUAGE

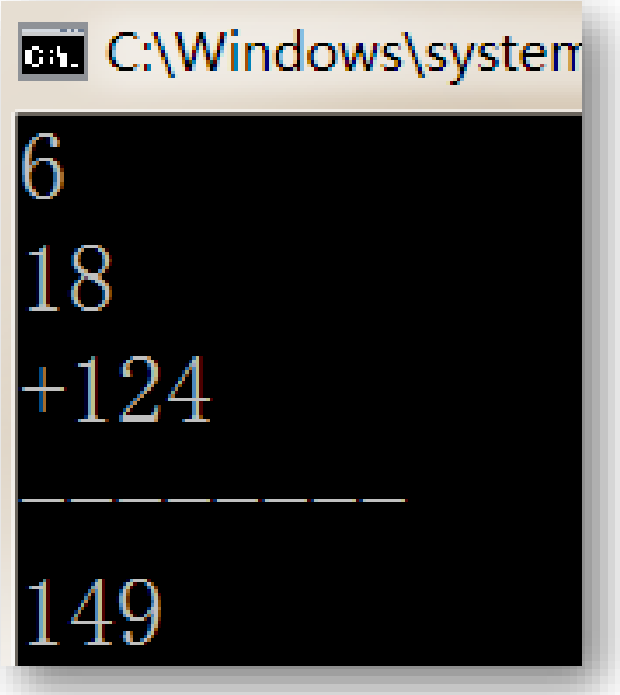
- Program 3.12 A First Look at User-Input Validation
  - As written, Program 3.12 is not **robust(健壮).**
  - Enter three integer numbers: 10 20.68 20
  - Handling invalid data input is called ***user-input validation***
  - Providing the user with a way of ***reentering*** any invalid data

3.4 Formatted Output 格式化输出

THE C PROGRAMMING LANGUAGE

- Program 3.13

```
#include <stdio.h>
int main(){
        printf("%d\n",6);
        printf("%d\n",18);
        printf("+%d\n",124);
        printf("--------\n");
        printf("%d\n",6+18+125);
        return 0;
}
```



Output is not aligned

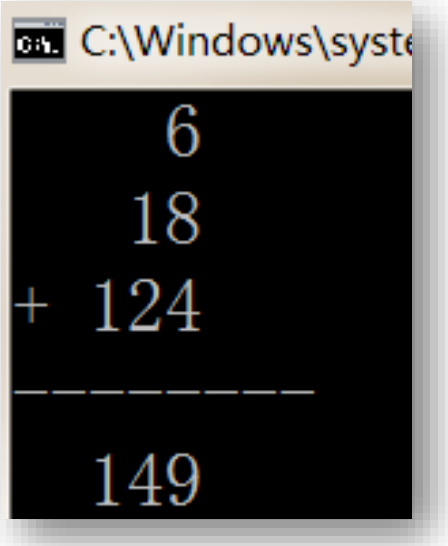
3.4 Formatted Output

THE C PROGRAMMING LANGUAGE

- Program 3.13

```
#include <stdio.h>
int main(){
printf("%5d\n",6);
printf("%5d\n",18);
printf("+%4d\n",124);
printf("--------\n");
printf("%5d\n",6+18+125);
return 0;
}
```

Field width specifier
字段宽度说明符



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➢ Field Width Specifiers 字段宽度说明符

Table 3.6 Effect of Field Width Specifiers

Specifier	Number	Display	Comments
%2d	3	⅄3	Number fits in field
%2d	43	43	Number fits in field
%2d	143	143	Field width ignored
%2d	2.3	Compiler dependent	Floating-point number in an integer field
%5.2f	2.366	⅄2.37	Field of 5 with 2 decimal digits
%5.2f	42.3	42.30	Number fits in field
%5.2f	142.364	142.36	Field width ignored but fractional specifier is used
%5.2f	142	Compiler dependent	Integer in a floating-point field

3.4 Formatted Output

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- Format Modifiers 格式修饰符
  - Left justification 左侧调整:
    - printf("% -10d",59); //display 59^^^^^^^^
  - Explicit sign display 显式符号显示:
    - printf("%+10d",59); //display ^^^^^^^+59
  - Format modifiers may be combined
    - printf("%+-10d",59); //display +59^^^^^^^
    - printf("%-+10d",59); //display +59^^^^^^^

3.4 Formatted Output

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- Program 3.15 Other Number Bases 其它数基

```
1. #include <stdio.h>
2. int main(){
3.  printf("the decimal value of 15 is %d\n", 15);
4.  printf("the octal value of 15 is %o\n", 15);
5.  printf("the hexadecimal value of 15 is %x\n", 15);
6.  return 0;
7. }
```

C:\Windows\system32\cmd.exe

```
the decimal(base 10) value of 15 is 15
the octal(base 8) value of 15 is 17
the hexadecimal(base 16) value of 15 is f
```

3.4 Formatted Output

➢ Other Number Bases 其它数基

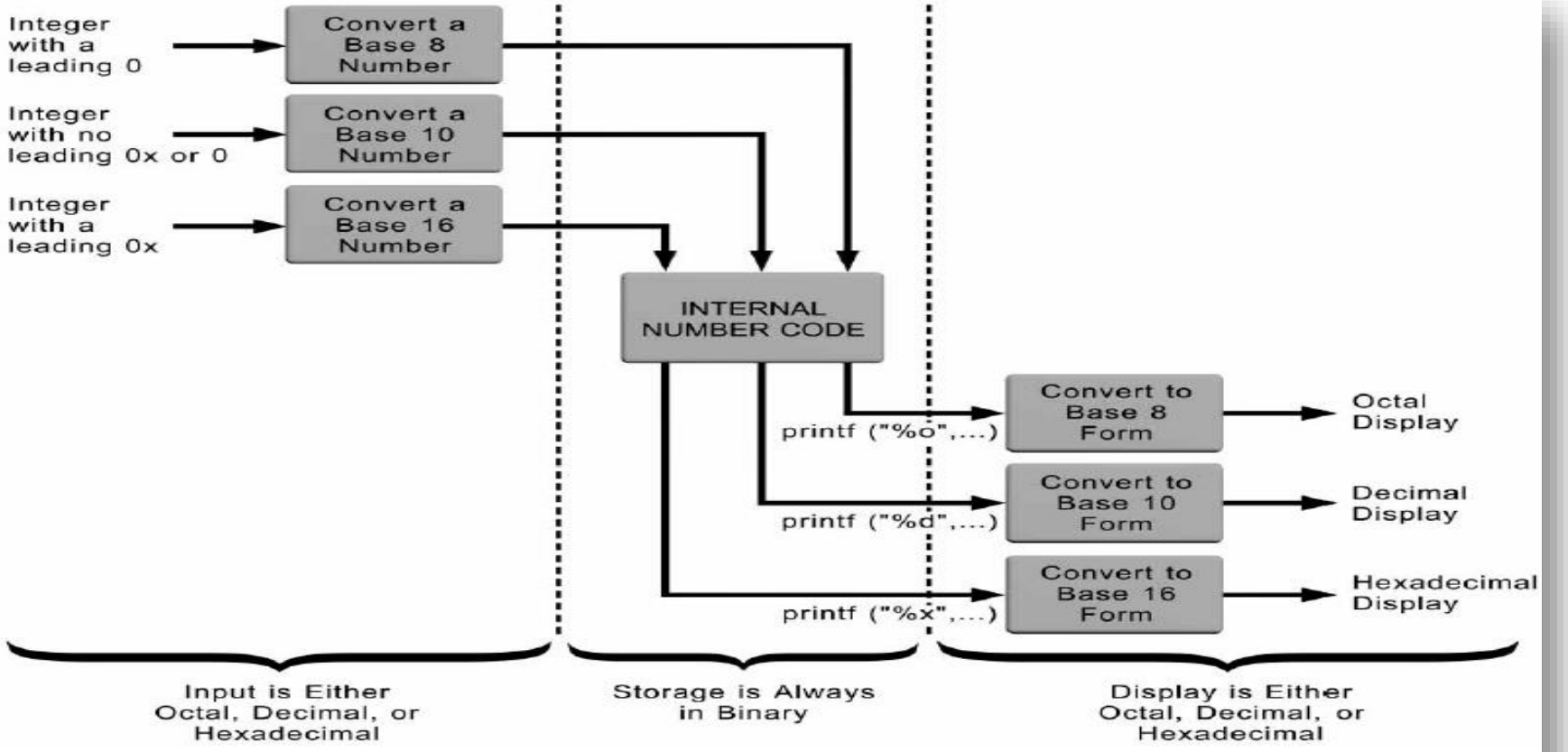

Figure 3.7 Input, storage, and display of integers

3.4 Formatted Output

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- Program 3.17 Other Number Bases

```
1. #include <stdio.h>
2. int main(){
3.   printf("the decimal value of  letter %c is %d\n", 'a', 'a');
4.   printf("the octal value of  letter %c is %o\n", 'a', 'a');
5.   printf("the hex value of  letter %c is %x\n", 'a', 'a');
6.   return 0;
7. }
```

C:\Windows\system32\cmd.exe

```
the decimal value of  letter a is 97
the octal value of  letter a is 141
the hex value of  letter a is 61
```

Reference

- BOOK
- Some part of this PPT given by Prof 区 **Chengtian Ouyang)**
- with special thank
- https://www.codingunit.com/c-tutorial hello-world