Jiangxi University of Science and Technology

Chapter 4 Selection

Lecture0403 The switch Statement

First 2

remain program
from last lecture

4.3 The if-else Chain

THE C PROGRAMMING LANGUAGE

- **Program 4.5 the monthly income of a salesperson**

Monthly Sales	Income
greater than or equal to $50,000	$575 plus 16% of sales
less than $50,000 but greater than or equal to $40,000	$550 plus 14% of sales
less than $40,000 but greater than or equal to $30,000	$525 plus 12% of sales
less than $30,000 but greater than or equal to $20,000	$500 plus 9% of sales
less than $20,000 but greater than or equal to $10,000	$450 plus 5% of sales
less than $10,000	$400 plus 3% of sales

4.3 The if-else Chain

THE C PROGRAMMING LANGUAGE

Program 4.5 the monthly income of a salesperson


```
1.    #include <stdio.h>
2.    int main(){
3.            double monthlySales, income;
4.            printf( "Enter the value of monthly sales:");
5.            scanf("%lf", &monthlySales);
6.            if (monthlySales >= 50000.00)
7.                    income = 375.00 + .16 * monthlySales;
8.            else if (monthlySales>=40000.00)
9.                    income = 350.00 + .14 * monthlySales;
10.           else if (monthlySales>=30000.00)
11.           income = 325.00 + .12 * monthlySales;
12.    else if (monthlySales >= 20000.00)
12.                   income=300.00 + .09*monthlySales;
13.           else if (monthlySales >= 10000.00)
14.                   income=250.00+.05 *monthlySales;
15.           else
16.                   income = 200.00+.03*monthlySales;
17.           printf("The income is %7.2f", income);
18.           return 0;
19.   }
```

Jiangxi University of Science and Technology

Chapter 4 Selection

Lecture0403 The switch Statement

4.4 The switch Statement 开关语句

THE C PROGRAMMING LANGUAGE

➢ The *switch* Statement

```
switch (integer_expression)
{
case value1:
        statement(s);
        break;
case value2:
        statement(s);
        break;
        …
case valuen:
        statement(s);
        break;
default:
        statement(s);
}
```

If the break statement was omitted, the following case would be executed

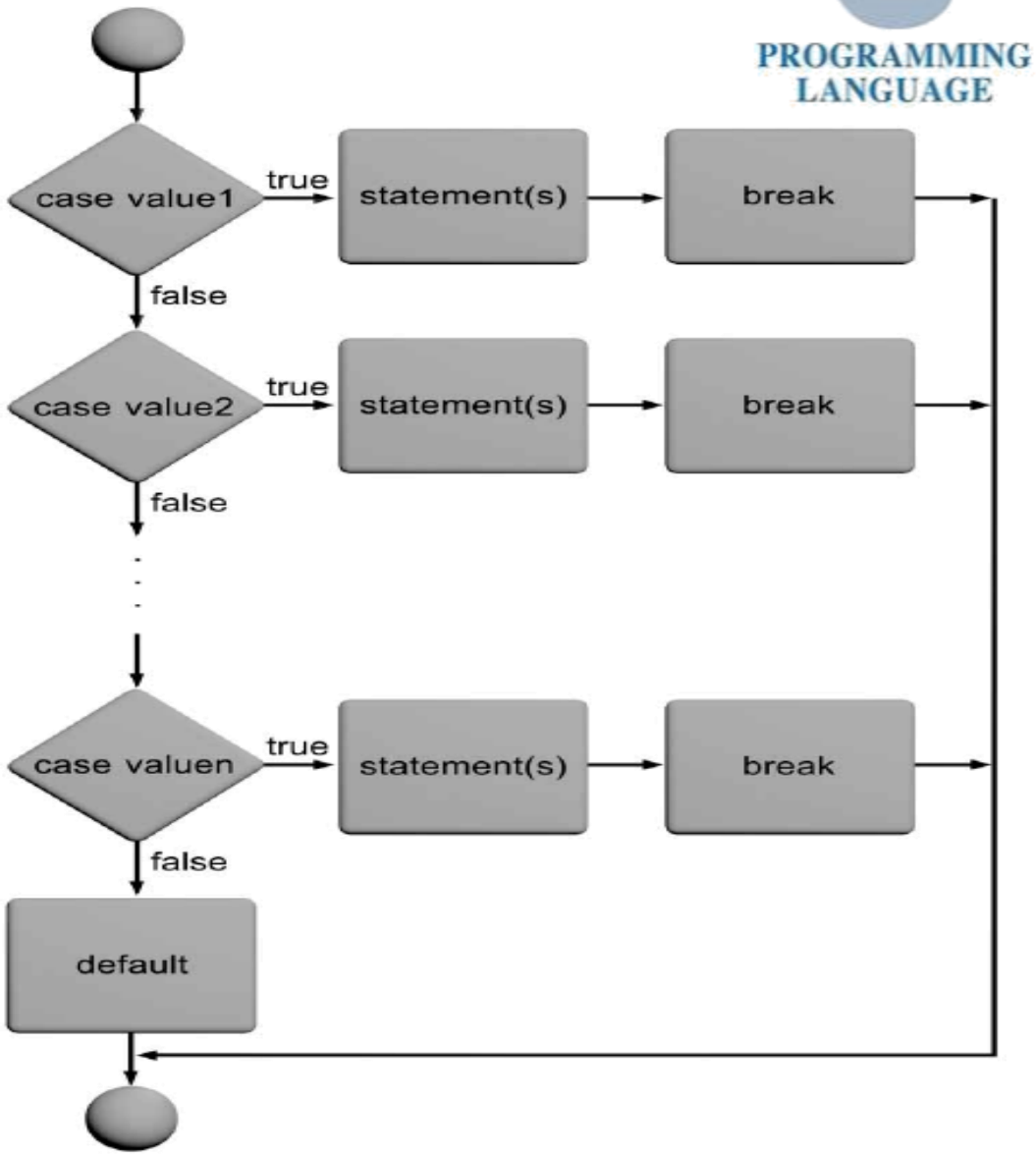


Figure 4.7 The switch flowchart

4.4 The switch Statement

- **Program 4.6**

```
1.  #include <stdio.h>
2.  int main(){
3.    int opselect;
4.    float fnum, snum;
5.    printf("Please type in two numbers: ");
6.    scanf("%f %f", &fnum, &snum);
7.    printf("Enter a select code:");
8.    printf("\n 1 for addition");
9.    printf("\n 2 for multiplication");
10.   printf("\n 3 for division : ");
11.   scanf("%d", &opselect);
```

```
1.   switch (opselect)  {
2.      case 1:
3.  printf("The sum of the numbers entered is %6.3f\n", fnum+snum);
4.            break;
5.      case 2:
6.  printf("The product of the numbers entered is %6.3f\n", fnum*snum);
7.             break;
8.   case 3:
9.        if (snum != 0.0)
10. printf("The first number divided by the second is %6.3f\n",fnum/snum);
11.       else
12. printf("Division by zero is not allowed\n");
13.       break; /* this break is optional */
14.   } /* end of switch statement */
15.   return 0;
16. } /* end of main() */
```

4.4 The switch Statement

THE C PROGRAMMING LANGUAGE

- Program 4.6

```
3   {
4       int opselect;
5       float fnum, snum;
6       printf("Please type in two numbers: ");
7       scanf("%f %f", &fnum, &snum);
8       printf("Enter a select code:");
9       printf("\n 1 for addition");
10      printf("\n 2 for multiplication");
11      printf("\n 3 for division : ");
12      scanf("%d", &opselect);
```

```
Please type in two numbers:
```

4.5 Case Study: Data Validation

THE C PROGRAMMING LANGUAGE

- Defensive programming 防御性编程
  - Defensive programming is a technique where the program includes code to check for improper data before an attempt is made to process it further
  - Checking user input data for erroneous or unreasonable data is called ***input data validation*** (输入数据有效性)

4.5 Case Study: Data Validation

THE C PROGRAMMING LANGUAGE

- Program 4.6 **Data Validation**
  - Requirements:
  - Write a program to calculate the ***square root*** *平方根* and the ***reciprocal*** 倒数 of a user-entered number.
  - ***Validate*** that the number is ***not negative*** before attempting to take its ***square root*** and that the number is ***not 0*** before calculating the number's ***reciprocal value***.

4.5 Case Study: Data Validation

Program 4.7

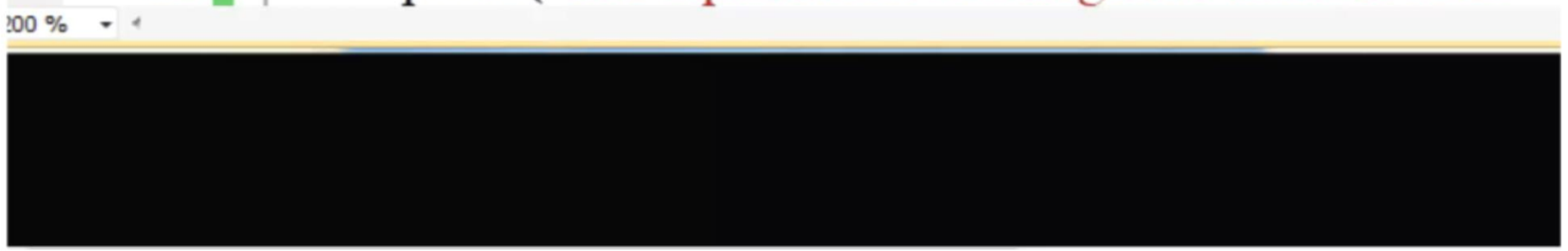
```
1.  #include <stdio.h>
2.  #include <math.h>
3.  int main(){
4.    float usenum;
5.     printf("This program calculates the square root and\n");
6.     printf("reciprocal (1/number) of a number\n");
7.     printf("\nPlease enter a number: ");
8.     scanf("%f", &usenum);
9.  if (usenum < 0.0)
10. printf("The square root of a negative number does not exist.\n");
11. else
12. printf("The square root of %f is %f\n", usenum, sqrt(usenum));
13. if (usenum == 0.0)
14. printf("The reciprocal of zero does not exist.\n");
15. Else
16. printf("The reciprocal of %f is %f\n", usenum, 1/usenum);
17. return 0;
18. }
```

4.5 Case Study: Data Validation

THE C PROGRAMMING LANGUAGE

- Program 4.7

```
1  #include <stdio.h>
2  #include <math.h>
3  int main(){
4      float usenum;
5      printf("This program calculates the square root and\n")
6      printf("reciprocal (1/number) of a number\n");
7      printf("\nPlease enter a number: ");
8      scanf("%f", &usenum);
9      if (usenum < 0.0)
10         printf("The square root of a negative number does
```



4.7 Summary

THE C PROGRAMMING LANGUAGE

1. Relational expressions, which are also called simple conditions, are used to compare operands
2. Conditions can be constructed from relational expressions using C's logical operators, &&, ||, and !
3. A one-way if statement has the general form
   - if (expression) statement;
4. A compound statement consists of any number of individual statements enclosed within braces
5. An if-else selects between two alternative statements based on the value of an expression
6. An if-else statement can contain other if-else statements
7. The if-else chain is a multiway selection statement
8. The switch statement is a multiway selection statement; program execution is transferred to the first matching case and continues through the end of the switch statement unless an optional break statement is encountered

Reference

- BOOK
- Some part of this PPT given by Prof 欧阳城添

(Prof: Chengtian Ouyang)

- with special thank
- https://www.codingunit.com/c-tutorial-first-c-program-hello-world