



"Ss. Cyril and Methodius" University in Skopje

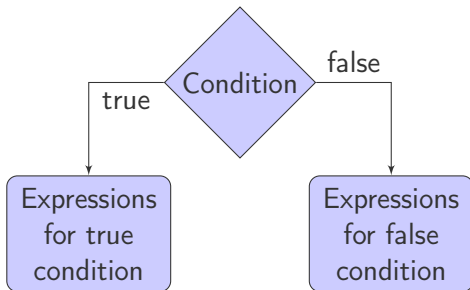
**FACULTY OF COMPUTER
SCIENCE AND ENGINEERING**

Lesson 3

Flow Control Statements `if/else`

Structured Programming

Remaining From Lecutres



```
if(condition) {  
    expressions_for_true_condtion;  
} else {  
    expressions_for_false_condition;  
}
```

if usage

Example 1

```
#include <stdio.h>
int main() {
    int i;
    printf("Enter an integer\n");
    scanf("%d", &i);
    if(i > 0)
        printf("The number is positive\n");
    if(i < 0)
        printf("The number is negative\n");
    if(i == 0)
        printf("The number is zero\n");
    return 0;
}
```

By using if-else

Example 2

```
#include <stdio.h>
int main() {
    int i;
    printf("Enter an integer\n");
    scanf("%d", &i);
    if(i > 0)
        printf("The number is positive\n");
    else if(i < 0)
        printf("The number is negative\n");
    else
        printf("The number is zero\n");
    return 0;
}
```

Simple examples

What will be the output?

Example 3

```
#include <stdio.h>
int main() {
    int m = 5, n = 10;
    if(m > n)
        ++m;
    ++n;
    printf("m = %d, n = %d\n", m, n);
    return 0;
}
```

m = 5, n = 11

Problem 1

Write a program that prints out the maximum from two numbers read from standard input.

Solution

```
#include <stdio.h>

int main() {
    int a, b;
    printf("Enter a and b: \n");
    scanf("%d %d", &a, &b);
    if (a > b)
        printf("Maximum: %d\n", a);
    else
        printf("Maximum: %d\n", b);
    return 0;
}
```

Problem 2

Write a program that checks if given year read from SI is leap or not and prints out a appropriate message.

Example: 1976, 2000, 2004, 2008, 2012...

Solution

```
#include <stdio.h>
int main() {
    int year;
    printf ("Enter the year: \n");
    scanf ("%d", &year);
    if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0)
        printf ("%d year is leap.\n", year);
    else
        printf ("%d year is not leap.\n", year);
    return 0;
}
```

Problem 3

The coordinates of a point are read from SI. Write a program that will print out the quadrant or the axis where the point belongs. If the point lays on the origin, print out a appropriate message.

Solution part 1

```
#include <stdio.h>
int main () {
    float x, y;
    printf ("Enter coordinates \n");
    scanf ("%f %f", &x, &y);
    if (x > 0) {
        if (y > 0)
            printf("I Quadrant.\n");
        else if (y < 0)
            printf("IV Quadrant.\n");
        else printf("Pos. X axis.\n");
    }
```


Problem 3

Solution

Solution part 2

```
} else if (x < 0) {  
    if (y > 0)  
        printf("II Quadrant.\n");  
    else if (y < 0)  
        printf("III Quadrant.\n");  
    else  
        printf("Neg. x axis.\n");  
}  
else {  
    if (y > 0)  
        printf("Pos. y axis.\n");  
    else if (y < 0)  
        printf("Neg. y axis.\n");  
    else  
        printf("Origin\n");  
}  
return 0;  
}
```

Problem 4

Write a program that will generate and print the grade according to the following table:

Points	Grade
0 - 50	5
51 - 60	6
61 - 70	7
71 - 80	8
81 - 90	9
91 - 100	10

Problem 4

Solution

Solution

```
#include <stdio.h>
int main () {
    int i, ocenka = 0;
    printf("Enter points: \n");
    scanf("%d", &i);
    if (i >= 0 && i <= 50) ocenka = 5;
    else if (i > 50 && i <= 60) ocenka = 6;
    else if (i > 60 && i <= 70) ocenka = 7;
    else if (i > 70 && i <= 80) ocenka = 8;
    else if (i > 80 && i <= 90) ocenka = 9;
    else if (i > 90 && i <= 100) ocenka = 10;
```

Problem 5

Change the previous program, so the sign of the number should be printed (+/-) depending on the last digit of the points number:

last digit	print
1 - 3	-
4 - 7	<empty space>
8 - 0	+

Example: 81 = 9-, 94 = 10, 68 = 7+.

For grade 5 doesn't add + or -, and for grade 10 should not add +.

Problem 5

Solution

Solution

```
// same as previous problem (problem 4)
char znak = ' ';
if (ocenka) {
    int p = i % 10;
    if (ocenka != 5) {
        if (p >= 1 && p <= 3) znak = '-';
        else if (ocenka != 10 && (p >= 8 || p == 0))
            znak = '+';
    }
    printf("The grade is %d%c.\n", ocenka, znak);
}
return 0;
}
```

Problem 6

Write a program for simple calculator. The program reads two numbers and operator in format:

```
num1 operator num2
```

After the operation, depending on the operator, the result should be printed in format:

```
num1 operator num2 = result
```

Problem 6

Solution

Solution

```
#include <stdio.h>
int main() {
    char op; float num1, num2, result;
    printf("Enter two numbers and operator in format\n");
    printf(" num1 operator num2\n");
    scanf("%f %c %f", &num1, &op, &num2);
    if (op == '*') result = num1 * num2;
    else if (op == '+') result = num1 + num2;
    else if (op == '-') result = num1 - num2;
    else if (op == '/') {
        if (num2) result = num1 / num2;
        else {
            printf("Division by 0!\n");
            return 0;
        }
    } else {
        printf("Invalid operator!\n");
        return 0;
    }
    printf("%f %c %f = %f\n", num1, op, num2, result);
    return 0;
}
```

Problem 7

Read from standard input three numbers in arbitrary order. The numbers are lengths of triangle sides. Write a program that will check if triangle can be constructed from given lengths, if so, then should check if the triangle is right triangle and compute its area. On contrary, appropriate messages should be printed.

Problem 7

Solution

Solution

```
#include <stdio.h>
int main() {
    int a, b, c, tmp;
    printf("Enter the triangle sides: \n");
    scanf("%d %d %d", &a, &b, &c);
    if ((a + b <= c) || (a + c <= b) || (b + c <= a))
        printf("Triangle can not be constructed.\n");
    else {
        if (a >= b) {
            tmp = a; a = b; b = tmp;
        }
        if (a >= c) {
            tmp = a; a = c; c = tmp;
        }
        if (b >= c) {
            tmp = b; b = c; c = tmp;
        }
        if (c * c == a * a + b * b) {
            printf("Triangle is right triangle.\n");
            printf("Area is %.3f.\n", a * b / 2.0);
        } else {
            printf("Triangle is not right triangle.\n");
        }
    }
    return 0;
}
```

Materials and Questions

Lectures, exercises and announcements
`courses.finki.ukim.mk`

Source code of all examples and problems
`https://github.com/tdelev/SP/tree/master/latex/src`

Questions and discussion
`forum.finki.ukim.mk`