Introduction to Informatics

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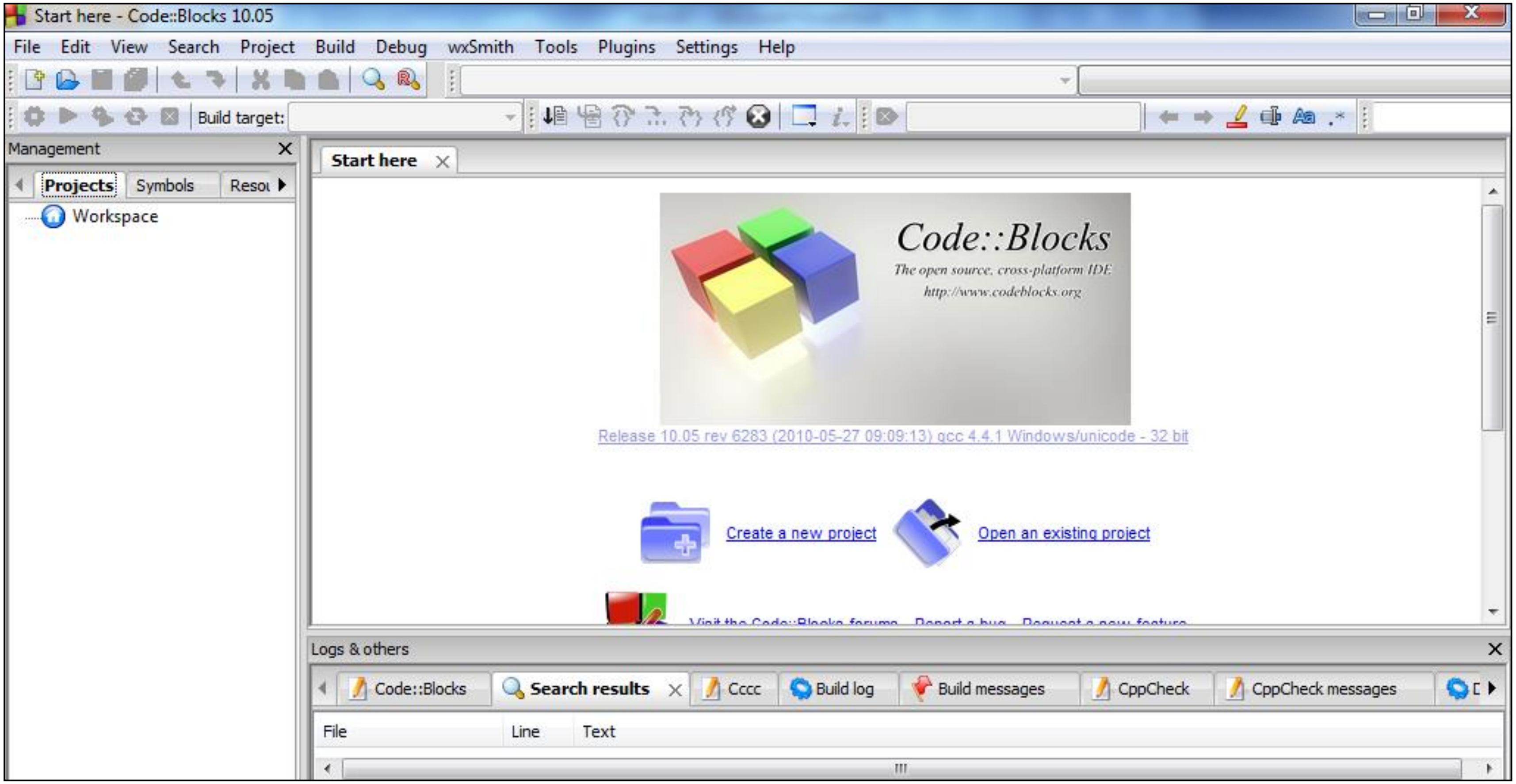
Labor 07

C programming languages

- Code::Bloks
  - MinGW – Compiler
- Eclipse IDE for C/C++ Developers
- Dev C++
- NetBeans IDE C/C++

Code::Blocks



Code::Blocks
The open source, cross-platform IDE
http://www.codeblocks.org

Release 10.05 rev 6283 (2010-05-27 09:09:13) gcc 4.4.1 Windows/unicode - 32 bit

Code::Blocks

- Create a new project
- Consol application -> Go
- Next -> C
- Project title: Lab06
- Folder to create project in:
- Next
- GNU GCC Compiler
- Finish

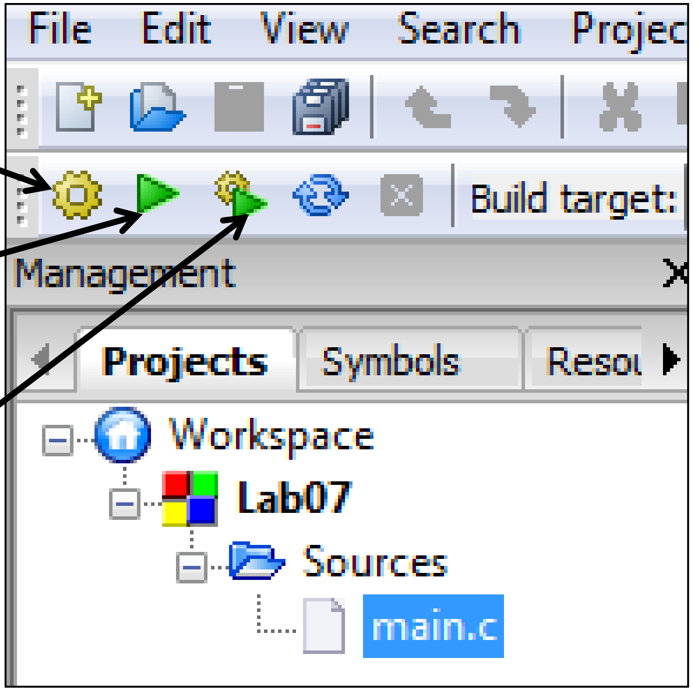
First program in C

```
#include <stdio.h>

int main()
{
    printf("Hello world!\n");
    return 0;
}
```

Code::Blocks

- Build CTRL-F9
- Run CTRL-F10
- Build & Run F9



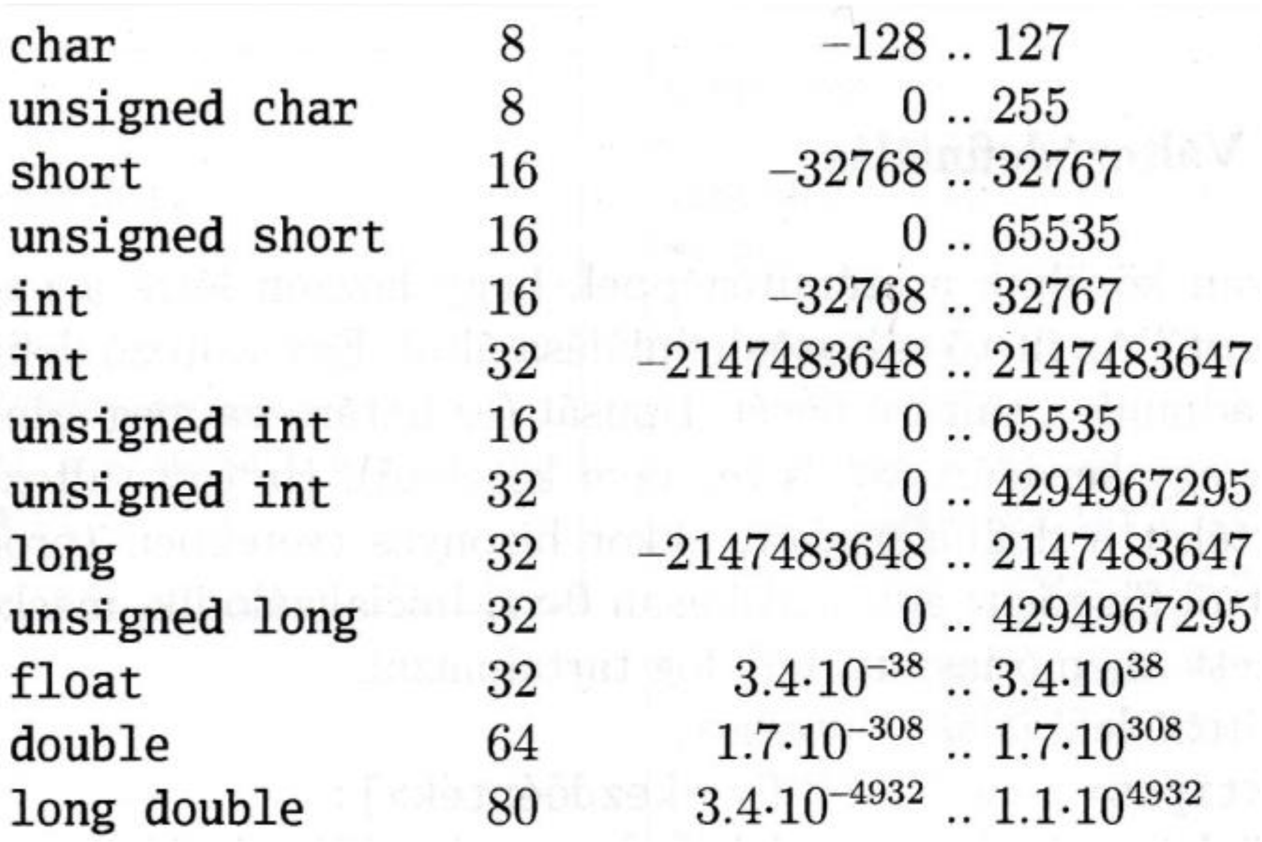
Variables

- differences between small and capital letter
- using **&** operator we can refer to the address of (the variable) **a**, **&a**
- **char, int:** store the integer numbers
- **char:** store characters
- **float, double:** store the real numbers

Definition of the variables

- **int** a;
- **float** b1, b2;
- **long** i, j=2, k;
- **unsigned char** c=65;
- **long double** x, y=3.14;

Types of data



char	8	–128 .. 127
unsigned char	8	0 .. 255
short	16	–32768 .. 32767
unsigned short	16	0 .. 65535
int	16	–32768 .. 32767
int	32	–2147483648 .. 2147483647
unsigned int	16	0 .. 65535
unsigned int	32	0 .. 4294967295
long	32	–2147483648 .. 2147483647
unsigned long	32	0 .. 4294967295
float	32	$3.4{\cdot}10^{-38}$ .. $3.4{\cdot}10^{38}$
double	64	$1.7{\cdot}10^{-308}$ .. $1.7{\cdot}10^{308}$
long double	80	$3.4{\cdot}10^{-4932}$ .. $1.1{\cdot}10^{4932}$

Format Specifiers

Type	Format specifiers
char	%c
int	%d or %i (10-es), %o (base 8), %x, %X (base 16)
unsigned int	%u
short int	%hd or %hi
unsigned short int	%hu
long int	%ld or %li
unsigned long int	%lu
float	%f
double	%lf
long double	%Lf
karakterlánc	%s

Types of data

- **int** – data type
- int is used to define integer numbers.

```
int Count;
Count = 5;
```

- **char** – data type
- char defines characters.

```
char Letter;
Letter = 'x';
```

Types of data

- **float** – data type
- float is used to define floating point numbers.

```
float Miles;
Miles = 5.6;
```

- **double** – data type
- double is used to define BIG floating point numbers. It reserves twice the storage for the number.

```
double Atoms;
Atoms = 2500000;
```

Example

```
#include <stdio.h>
#include <stdlib.h>

int main()
{
            int a,b;
            float c,d;

            a = 15;
            b = a/2;
            printf("%d\n",b);
            printf("%3d\n",b);
            printf("%03d\n",b);

            c = 15.3;
            d = c/3;
            printf("%3.2f\n",d);
    return 0;
}
```

Solution:

```
7
  7
007
5.10
```

scanf()

- **scanf** (“Formatted_specifier”, &variable_ name)
- **&** (Address Operator)
- **scanf**(”%d”,**&**a);
- **scanf**(”%d %d”,&a,&b);

Exercise

- Write a program to input two numbers and print their sum, product, difference and quotient?

Solution

```
#include<stdio.h>
int main()
{
int a,b,c;
printf("enter value of a and b:");
scanf("%d %d",&a,&b");

c=a+b;
printf("sum: %d",c);

c=a*b;
printf("\n product: %d"c);

c=a-b;
printf("difference: %d",c);

c=a/b;
printf("quotient is: %d",c);


return 0;
}
```

Exercise

Write a program to input two integer numbers into two variables, change the content of the variables with each other and print the variables in inverse order.

Solution A – using auxiliar variable

Solution B – without using auxiliar variable

Solution C – using bit operators

Solution A

```
int a,b,tmp;

printf("a=");    scanf("%d",&a);
printf("b=");    scanf("%d",&b);

      tmp=a;
       a=b;
       b=tmp;

printf(" The reversed numbers:\n a=%d\n b=%d",a,b);
```

Solution B

```
Int a,b,tmp;

printf("a=");    scanf("%d",&a);
printf("b=");    scanf("%d",&b);

    a=a–b;  //a–=b;
     b=a+b; //b+=a;
     a=b–a;

printf(" The reversed numbers:\n a=%d\n b=%d",a,b);
```

Solution C

```
int a,b,tmp;

printf("a=");    scanf("%d",&a);
printf("b=");    scanf("%d",&b);

        a^=b;
        b^=a;
        a^=b;

printf("The reversed numbers:\n a=%d\n b=%d",a,b);
```