PROGRAMAÇÃO
MIEIC – 2012/2013

Aula 01

Introdução ao Visual Studio

- Criar um primeiro projeto em C/C++, usando o Visual Studio, seguindo os passos indicados no documento "Visual Studio – Introdução", disponível na página da U.C. no Moodle da FEUP.
- Outros IDE's (*Integrated Development Environments* - ambientes integrados de desenvolvimento) poderão ser usados, como, por exemplo: Code::Blocks, Eclipse, Netbeans, etc.; na web, existem tutoriais de utilização destes IDE's.

Primeiros programas em C/C++

- Tentar criar outro projeto, sem recorrer às instruções dadas no documento anteriormente referido, usando o código a seguir apresentado.
- Procurar interpretar o código, tendo em conta os comentários nele incluídos. Solicitar a ajuda do docente, se necessário.
- Compilar e executar o programa resultante:
    - 1 - a partir do IDE;
    - 2 – a partir do interpretador de comandos (Command Prompt).

Programa 01

```
/*
PROGRAM 01
Test whether the user knows the basic math tables.
JAS
2013-02-12
*/

#include <iostream>
#include <ctime>

using namespace std;

int main(void)
{
  // variable declarations and initialization
  int operand1, operand2, result, answer;
  char operators[4] = {'+','-','*','/'};
  char operation; // why not 'operator' ...?

  // initialize random number generator
  srand((unsigned int) time(NULL));

  // randomly generate operands and operator
  operand1 = rand() % 10 + 1;
  operand2 = rand() % 10 + 1;
  operation = operators[rand() % 4];

  // calculate the correct result
  switch (operation)
  {
  case '+':
    result = operand1 + operand2;
    break;
  case '-':
    result = operand1 - operand2;
    break;
  case '*':
    result = operand1 * operand2;
    break;
```

```
  case '/':
    result = operand1 / operand2;
    break;
  }

  // ask the answer from the user
  cout << operand1 << " " << operation << " " << operand2 << " ? ";
  cin >> answer;

  // verify if the answer of the user is correct
  if (answer == result)
    cout << "Correct answer. Congratulations\n";
  else
    cout << "Wrong answer ...\n";

  return 0;
}
```

Programa 02

- Modificar o programa anterior, acrescentando o código assinalado a amarelo.
- Compilar e executar o programa, várias vezes, modificando os valores de `MAX_OPERAND_VALUE` e de `NUM_OPERATIONS`.

```
/*
PROGRAM 02
Test whether the user knows the basic math tables.
Max operand value and no. of operations can be changed, but recompilation is
necessary...
JAS
2013-02-12
*/

#include <iostream>
#include <ctime>

using namespace std;

int main(void)
{
  // variable declaration
  int operand1, operand2, result, answer;
  char operators[4] = {'+','-','*','/'};
  char operation; // why not 'operator' ...?
  int numCorrectAnswers = 0;
  const int MAX_OPERAND_VALUE = 10;
  const int NUM_OPERATIONS = 10;

  // initialize random number generator
  srand((unsigned int) time(NULL));

  for (int i=1; i<=NUM_OPERATIONS; i++)
  {
    // randomly generate operands and operator
    operand1 = rand() % MAX_OPERAND_VALUE + 1;
    operand2 = rand() % MAX_OPERAND_VALUE + 1;
    operation = operators[rand() % 4];

    // calculate the correct result
    switch (operation)
    {
    case '+':
      result = operand1 + operand2;
      break;
    case '-':
      result = operand1 - operand2;
      break;
    case '*':
      result = operand1 * operand2;
```

```
      break;
    case '/':
      result = operand1 / operand2;
      break;
    }

    // ask the answer from the user
    cout << operand1 << " " << operation << " " << operand2 << " ? ";
    cin >> answer;

    // verify if the answer of the user is correct
    // and update number of correct answers
    if (answer == result)
    {
      cout << "Correct answer. Congratulations!\n";
      numCorrectAnswers++;
    }
    else
      cout << "Wrong answer ...\n";
  }

  // show final result
  cout << "Number of correct answers = " << numCorrectAnswers << endl;

  return 0;
}
```

Programa 03

- Modificar o programa anterior, acrescentando o código assinalado a amarelo.
- Compilar e executar o programa, várias vezes, modificando os critérios de classificação do resultado final.
- Experimentar introduzir dados inválidos (ex: letras ou outros valores não numéricos) em resposta aos valores solicitados pelo programa. Nas próximas aulas teóricas veremos como resolver os problemas que surgem.

```
/*
PROGRAM 03
Test whether the user knows the basic math tables.
Max operand value and no. of operations can be selected by the user;
recompilation is not necessary.
JAS
2013-02-12
*/

#include <iostream>
#include <ctime>

using namespace std;

int main(void)
{
  // variable declaration
  int operand1, operand2, result, answer;
  char operators[4] = {'+','-','*','/'};
  char operation; // why not 'operator' ...?
  int numCorrectAnswers = 0;
  int maxOperandValue;
  int numOperations;

  // initialize random number generator
  srand((unsigned int) time(NULL));

  cout << "Maximum operand value? "; cin >> maxOperandValue;
  cout << "Number of operations ? "; cin >> numOperations;
```

```
  for (int i=1; i<=numOperations; i++)
  {
    // randomly generate operands and operator
    operand1 = rand() % maxOperandValue + 1;
    operand2 = rand() % maxOperandValue + 1;
    operation = operators[rand() % 4];

    // calculate the correct result
    switch (operation)
    {
    case '+':
      result = operand1 + operand2;
      break;
    case '-':
      result = operand1 - operand2;
      break;
    case '*':
      result = operand1 * operand2;
      break;
    case '/':
      result = operand1 / operand2;
      break;
    }

    // ask the answer from the user
    cout << operand1 << " " << operation << " " << operand2 << " ? ";
    cin >> answer;

    // verify if the answer of the user is correct
    // and update number of correct answers
    if (answer == result)
    {
      cout << "Correct answer. Congratulations\n";
      numCorrectAnswers++;
    }
    else
      cout << "Wrong answer ...\n";
  }

  // show final result
  cout << "Number of correct answers = " << numCorrectAnswers << endl;

  // classify results
  if (numCorrectAnswers <= (int) (0.3 * numOperations))
    cout << "VERY BAD ......\n";
  else
    if (numCorrectAnswers <= (int) (0.5 * numOperations))
      cout << "POOR...\n";
    else
      if (numCorrectAnswers <= (int) (0.7 * numOperations))
        cout << "FAIR\n";
      else
        if (numCorrectAnswers <= (int) (0.9 * numOperations))
          cout << "GOOD !\n";
        else
          cout << "EXCELLENT !!!\n";

  return 0;
}
```