Национальный технический университет

«Киевский политехнический институт»

Факультет информатики и вычислительной техники

## Кафедра Вычислительной Техники

#### Лабораторная работа №1

По курсу: Параллельное программирование

студента III-го курса,

группы ИВ-92

Петрука В.О.

## Киев 2011 г.

Source file: ..\main.ada Mon Sep 12 22:55:13 2011

1 -- Laboratorna robota 1

2 -- Petruk Vadim, IO-92

3 -- Variant: 1.13 C = A - B + D

4 -- 2.28 MD = MIN(MA)\*MB\*MC

5 -- 3.14 D = (A + B)\*(MA - MB)

6 ---------------------------------------

7 with Ada.Integer\_Text\_IO, Ada.Text\_iO;

8 use Ada.Integer\_Text\_IO, Ada.Text\_IO;

9 ---------------------------------------

10 procedure main is

11 n:constant := 5;

12 type Vector is array (1..N) of Integer;

13 type Matrix is array (1..N) of Vector;

14

15 A:Vector;

16 b:Vector;

17 c:Vector;

18 D:Vector;

19 MA:Matrix;

20 MB:Matrix;

21 MC:Matrix;

22 MD:Matrix;

23 ---------------------------------------

24 --service procedures

25

26 procedure VectorIn (x : out Vector) is

27 begin

28 for i in 1..N loop

29 x(i):=2;

30 end loop;

31 end VectorIn;

32 ---------------------------------------

33 procedure VectorOut (x : in Vector ) is

34 begin

35 for i in 1..N loop

36 put(x(i));

37 end loop;

38 New\_line;

39 end VectorOut;

40 ---------------------------------------

41 procedure MatrixIn (MX : out Matrix) is

42 begin

43 for i in 1..N loop

44 for j in 1..n loop

45 MX(i)(j):=2;

46 end loop;

47 end loop;

48 end MatrixIn;

49 ---------------------------------------

50 procedure MatrixOut (MX : in Matrix) is

51 begin

52 for i in 1..N loop

53 for j in 1..n loop

54 put(MX(i)(j));

55 if (j=n) then

56 New\_line;

57 end if;

58 end loop;

59 end loop;

60 New\_line;

61 end MatrixOut;

62 ---------------------------------------

63 --local Procedures

64 --Func1: C:=A-B+D

65 procedure Func1 (A, B, d : in Vector; c : out Vector) is

66 begin

67 for i in 1..n loop

68 c(i) := a(i)-B(i)+D(i);

69 end loop;

70 end Func1;

71 ---------------------------------------

72 --Func2: MD := MIN(MA)\*MB\*MC

73 procedure Func2 (MA, MB, MC : in Matrix; MD : out Matrix) is

74 min:Integer;

75 begin

76 --MD := (0)

77 for i in 1..n loop

78 for j in 1..n loop

79 MD(i)(j) := 0;

80 end loop;

81 end loop;

82 --MD := MB\*MC

83 for i in 1..n loop

84 for j in 1..n loop

85 for k in 1..n loop

86 MD(i)(j) := MD(i)(j)+MB(i)(k)\*MC(k)(j);

87 end loop;

88 end loop;

89 end loop;

90 --serching min(MA)

91 min := Ma(1)(1);

92 for i in 1..N loop

93 for j in 1..n loop

94 if MA(i)(j)<min then

95 min := MA(i)(j);

96 end if;

97 end loop;

98 end loop;

99 -- MD := Min(MA)\*MB\*MC

100 for i in 1..N loop

101 for j in 1..n loop

102 MD(i)(j) := MD(i)(j)\*Min;

103 end loop;

104 end loop;

105 end Func2;

106 ---------------------------------------

107 --Func3: D := (A + B)\*(MA - MB)

108 procedure Func3(A, B: in Vector;MA, MB: in Matrix; D: out vector) is

109 C:Vector;

110 MC:Matrix;

111 begin

112 --C:=A + B

113 for i in 1..N loop

114 C(i) := A(i) + B(i);

115 end loop;

116 --MC:=MA - MB

117 for i in 1..N loop

118 for j in 1..n loop

119 MC(i)(j) := MA(i)(j) + MB(i)(j);

120 end loop;

121 end loop;

122 --D := (0)

123 for i in 1..n loop

124 d(i) := 0;

125 end loop;

126 --D := C \* MC

127 for i in 1..n loop

128 for j in 1..n loop

129 D(j):= D(j) + C(j)\*MC(j)(i);

130 end loop;

131 end loop;

132 end func3;

133 ---------------------------------------

134 begin

135 VectorIn(A);

136 VectorIn(b);

137 VectorIn(d);

138 Func1(A,B,D,C);

139 put\_Line("Func1: C:=A-B+D ");

140 VectorOut(c);

141 --------------------------

142 matrixIn(MA);

143 MatrixIn(MB);

144 MatrixIn(MC);

145 func2(MA,MB,MC,MD);

146 put\_Line("Func2: MD := MIN(MA)\*MB\*MC");

147 MatrixOut(MD);

148 --------------------------

149 VectorIn(A);

150 VectorIn(b);

151 MatrixIn(MA);

152 MatrixIn(MB);

153 func3(a,b,MA,MB,d);

154 put\_Line("Func3: D := (A + B)\*(MA - MB)");

155 vectorOut(d);

156 --------------------------

157 end Main;

С пакетом:

Source file: ..\main.ada Mon Sep 12 23:01:11 2011

1 -- Laboratorna robota 1

2 -- Petruk Vadim, IO-92

3 -- Variant: 1.13 C = A - B + D

4 -- 2.28 MD = MIN(MA)\*MB\*MC

5 -- 3.14 D = (A + B)\*(MA - MB)

6 ---------------------------------------

7 with Ada.Integer\_Text\_IO, Ada.Text\_iO, Unit;

8 use Ada.Integer\_Text\_IO, Ada.Text\_IO, Unit;

9 ---------------------------------------

10 procedure main is

11

12 A:Vector;

13 b:Vector;

14 c:Vector;

15 D:Vector;

16 MA:Matrix;

17 MB:Matrix;

18 MC:Matrix;

19 MD:Matrix;

20

21 begin

22 VectorIn(A);

23 VectorIn(b);

24 VectorIn(d);

25 Func1(A,B,D,C);

26 put\_Line("Func1: C:=A-B+D ");

27 VectorOut(c);

28 --------------------------

29 matrixIn(MA);

30 MatrixIn(MB);

31 MatrixIn(MC);

32 func2(MA,MB,MC,MD);

33 put\_Line("Func2: MD := MIN(MA)\*MB\*MC");

34 MatrixOut(MD);

35 --------------------------

36 VectorIn(A);

37 VectorIn(b);

38 MatrixIn(MA);

39 MatrixIn(MB);

40 func3(a,b,MA,MB,d);

41 put\_Line("Func3: D := (A + B)\*(MA - MB)");

42 vectorOut(d);

43 --------------------------

44 end Main;

Source file: ..\unit.ads Mon Sep 12 23:01:11 2011

1 with Ada.text\_iO, Ada.Integer\_Text\_IO;

2 use Ada.Text\_IO, Ada.Integer\_Text\_IO;

3

4 package Unit is

5

6 n:constant := 5;

7

8 type Vector is private;

9 type Matrix is private;

10

11 procedure VectorIn (x : out Vector);

12 procedure VectorOut (x : in Vector );

13 procedure MatrixIn (MX : out Matrix);

14 procedure MatrixOut (MX : in Matrix);

15 procedure Func1 (A, b, d : in Vector; c : out Vector);

16 procedure Func2 (MA, MB, MC: in Matrix; MD : out Matrix);

17 procedure Func3(A, B: in Vector; MA, MB: in Matrix; D: out vector);

18

19 private

20 type Vector is array (1..n) of Integer;

21 type Matrix is array (1..n) of Vector;

22

23 end Unit;

Source file: ..\unit.adb Mon Sep 12 23:01:11 2011

1 package body Unit is

2 ---------------------------------------

3 procedure VectorIn (x : out Vector) is

4 begin

5 for i in 1..N loop

6 x(i):=2;

7 end loop;

8 end VectorIn;

9 ---------------------------------------

10 procedure VectorOut (x : in Vector ) is

11 begin

12 for i in 1..N loop

13 put(x(i));

14 end loop;

15 New\_line;

16 end VectorOut;

17 ---------------------------------------

18 procedure MatrixIn (MX : out Matrix) is

19 begin

20 for i in 1..N loop

21 for j in 1..n loop

22 MX(i)(j):=2;

23 end loop;

24 end loop;

25 end MatrixIn;

26 ---------------------------------------

27 procedure MatrixOut (MX : in Matrix) is

28 begin

29 for i in 1..N loop

30 for j in 1..n loop

31 put(MX(i)(j));

32 if (j=n) then

33 New\_line;

34 end if;

35 end loop;

36 end loop;

37 New\_line;

38 end MatrixOut;

39 ---------------------------------------

40 --Func1: C:=A-B+D

41 procedure Func1 (A : in Vector;

42 b : in Vector;

43 d : in Vector;

44 c : out Vector) is

45 begin

46 for i in 1..n loop

47 c(i) := a(i)-B(i)+D(i);

48 end loop;

49 end Func1;

50 ---------------------------------------

51 --Func2: MD := MIN(MA)\*MB\*MC

52 procedure Func2 (MA : in Matrix;

53 MB : in Matrix;

54 MC : in Matrix;

55 MD : out Matrix) is

56 min:Integer;

57 begin

58 --MD := (0)

59 for i in 1..n loop

60 for j in 1..n loop

61 MD(i)(j) := 0;

62 end loop;

63 end loop;

64 --MD := MB\*MC

65 for i in 1..n loop

66 for j in 1..n loop

67 for k in 1..n loop

68 MD(i)(j) := MD(i)(j)+MB(i)(k)\*MC(k)(j);

69 end loop;

70 end loop;

71 end loop;

72 --serching min(MA)

73 min := Ma(1)(1);

74 for i in 1..N loop

75 for j in 1..n loop

76 if MA(i)(j)<min then

77 min := MA(i)(j);

78 end if;

79 end loop;

80 end loop;

81 -- MD := Min(MA)\*MB\*MC

82 for i in 1..N loop

83 for j in 1..n loop

84 MD(i)(j) := MD(i)(j)\*Min;

85 end loop;

86 end loop;

87 end Func2;

88 ---------------------------------------

89 --Func3: D := (A + B)\*(MA - MB)

90 procedure Func3(A: in Vector;

91 B: in Vector;

92 MA: in Matrix;

93 MB: in Matrix;

94 D: out vector) is

95 C:Vector;

96 MC:Matrix;

97 begin

98 --C:=A + B

99 for i in 1..N loop

100 C(i) := A(i) + B(i);

101 end loop;

102 --MC:=MA - MB

103 for i in 1..N loop

104 for j in 1..n loop

105 MC(i)(j) := MA(i)(j) + MB(i)(j);

106 end loop;

107 end loop;

108 --D := (0)

109 for i in 1..n loop

110 d(i) := 0;

111 end loop;

112 --D := C \* MC

113 for i in 1..n loop

114 for j in 1..n loop

115 D(j):= D(j) + C(j)\*MC(j)(i);

116 end loop;

117 end loop;

118 end func3;

119 ---------------------------------------

120 end Unit;