INSTRUMENTATIE VIRTUALA

CURS 4

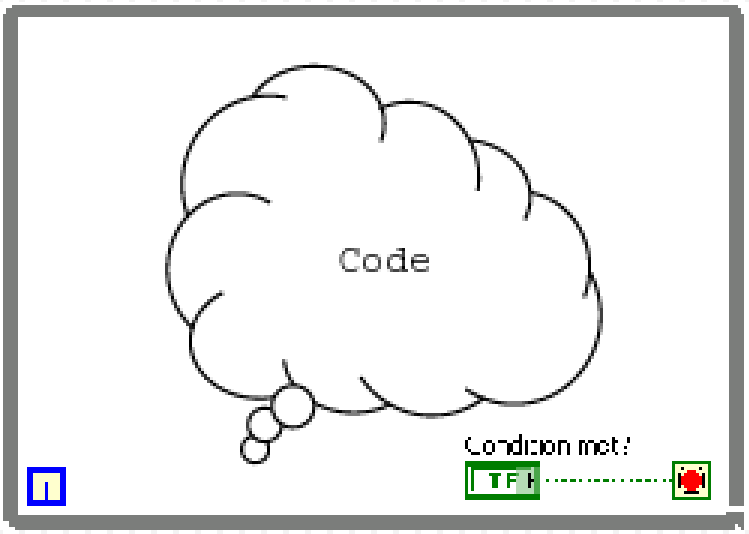
Structuri de programare in LabvIEW

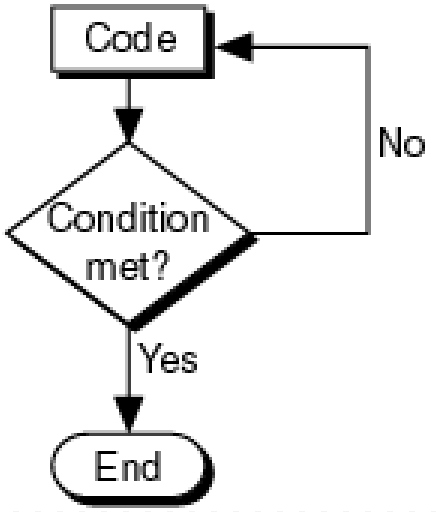
Vectori

Obiective

- Utilizarea structurilor de programare repetitive
- Utilizarea datelor de tip vectori

A. Bucla While

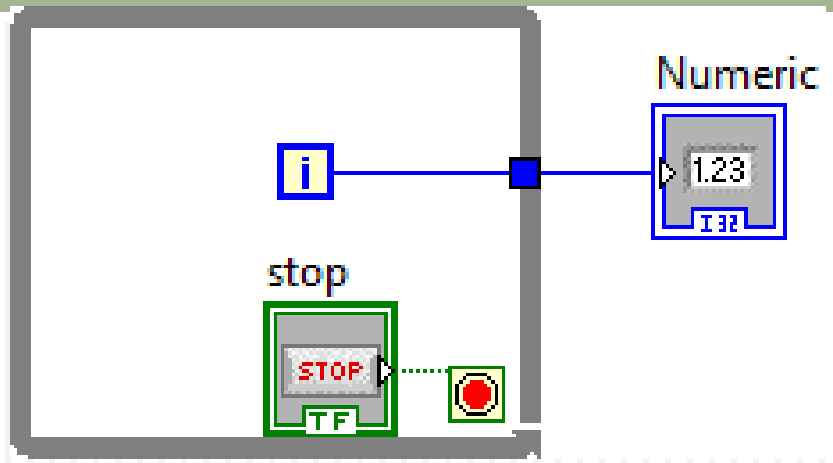





```
Repeata (codul);
Pina conditia este satisfacuta;
Sfirsit;
```

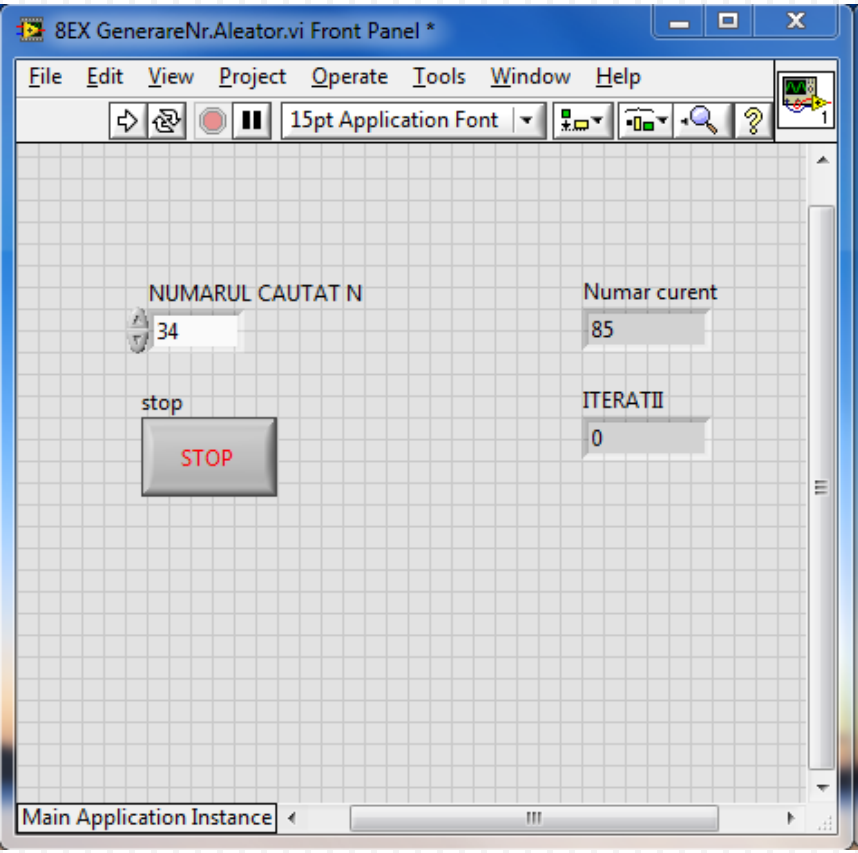
Bucla While in LabVIEW Diagrama de flux Pseudo Cod

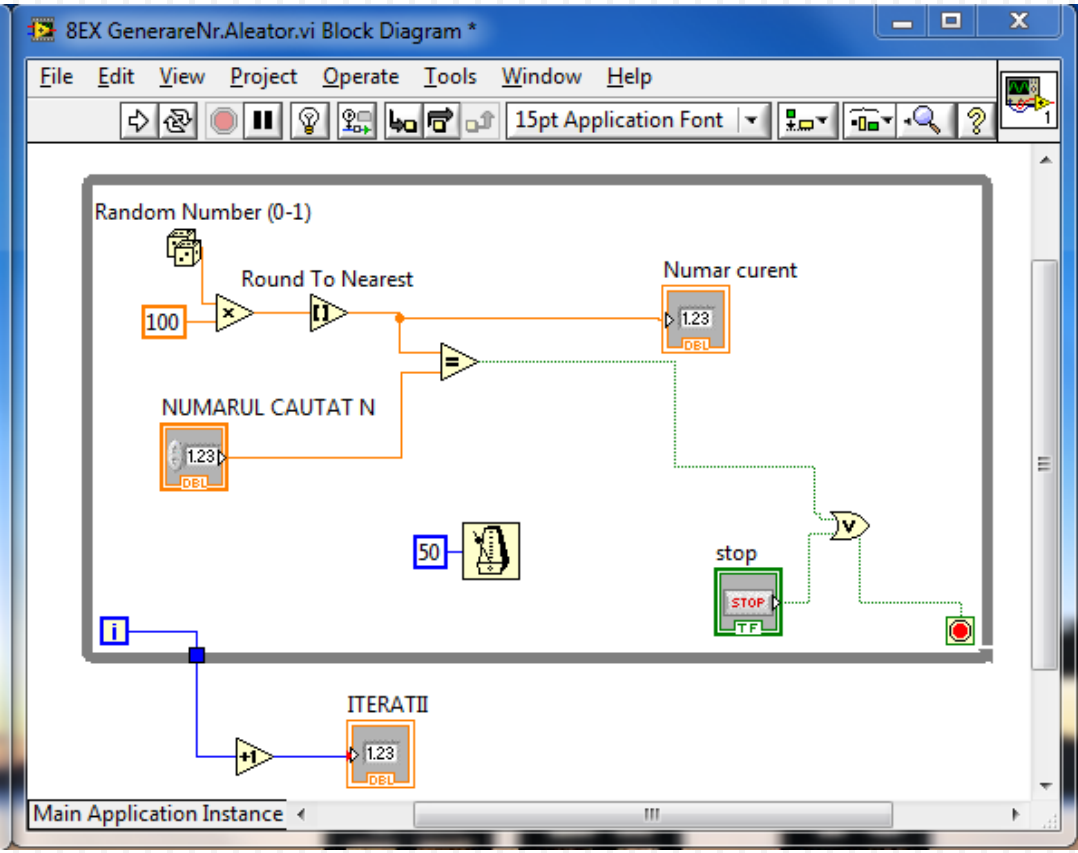
Tunelarea structurii



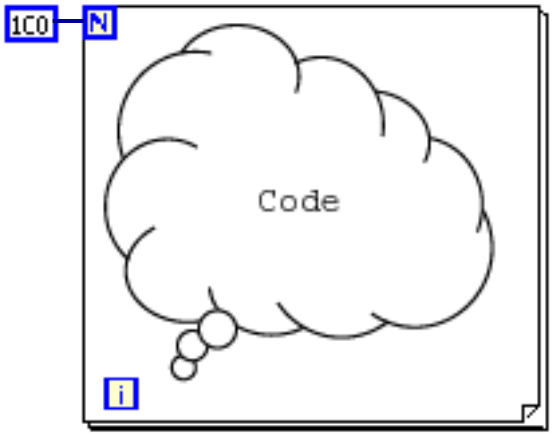
- Datele intra sau ies in structurile de programare prin Tunel
- Tunelul este un bloc ce apare pe bordura structurii; culoarea lui depinde de tipul de datele care sunt cablate la Tunel
- Cand un Tunel trimite datele intr-o bucla aceasta se ruleaza numai dupa ce datele ajung la tunel
- Datele ies din bucla numai cind bucla este terminata.

Generarea unui numar intreg N (dupa cate iteratii)

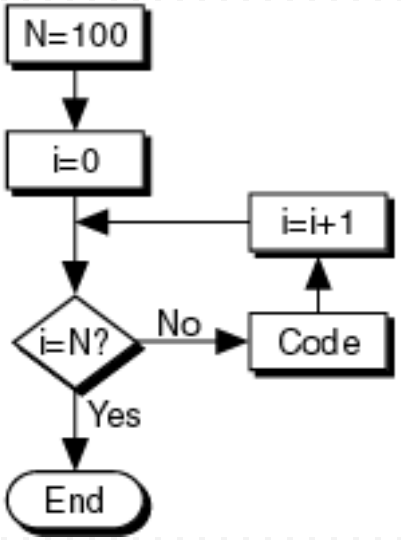




Bucla For



Bucla For in LabVIEW



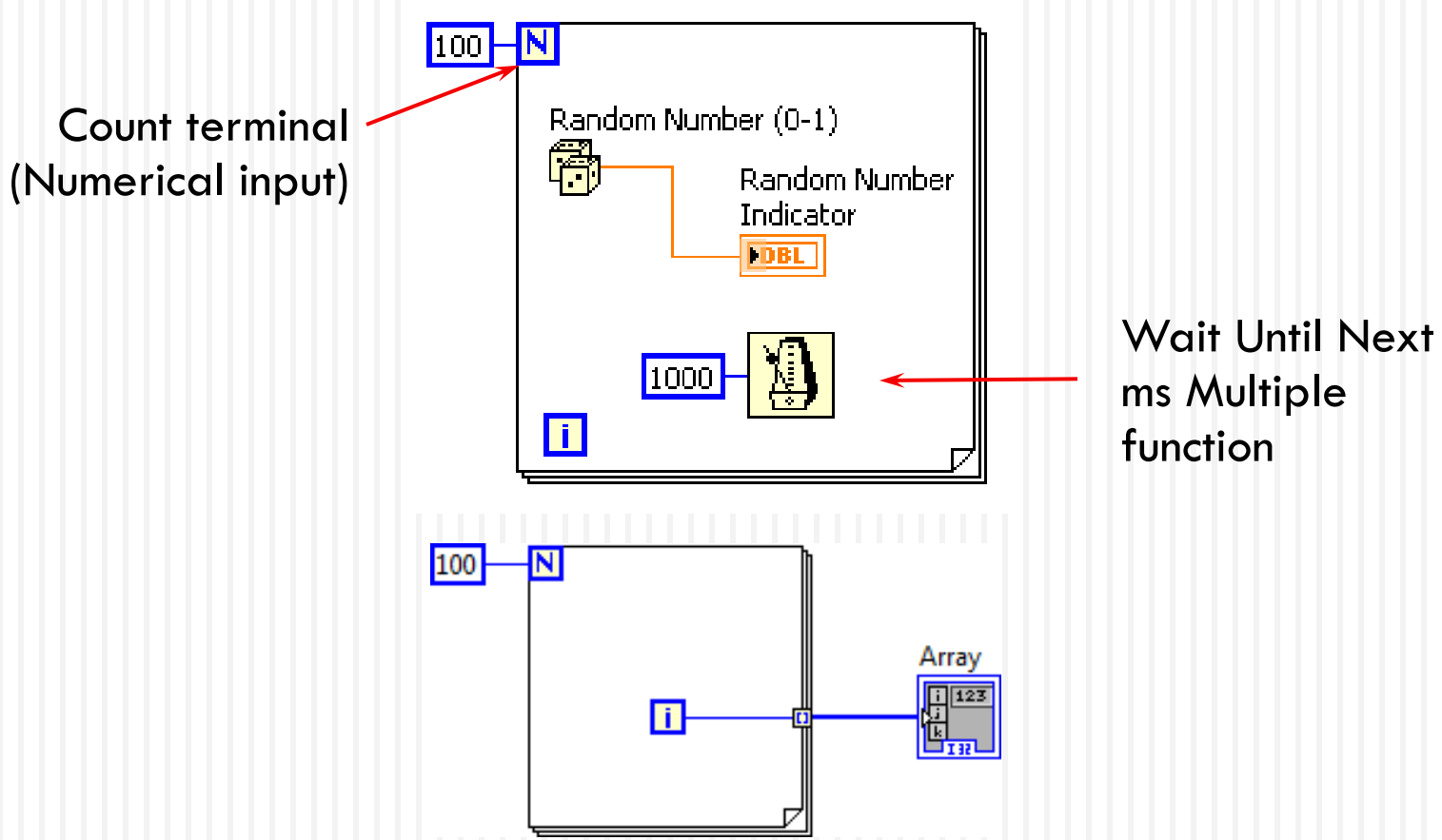
Digrama de flux

```
N=100;
i=0;
Until i=N:
Repeat (code; i=i+1);
End;
```

Pseudo Cod

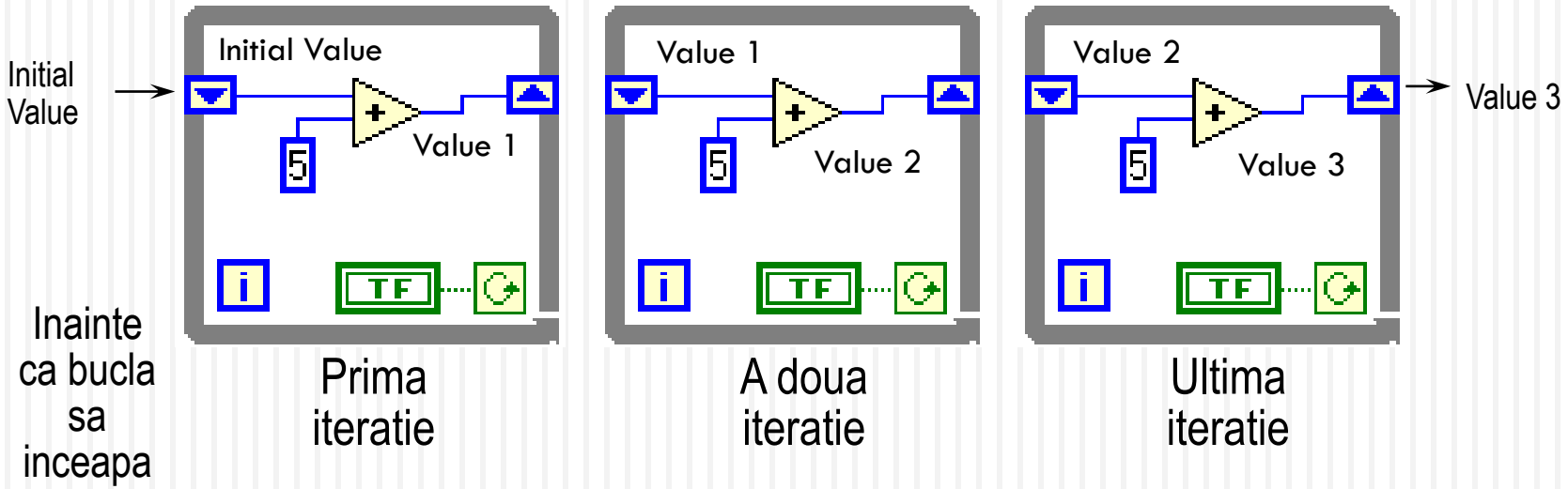
Bucla For

- Se ia din subpaleta Structures a paletei de Functii
- Introduceti codul sau nodurile necesare si cablati
- Se executa codul din interiorul buclei de un numar fix de ori



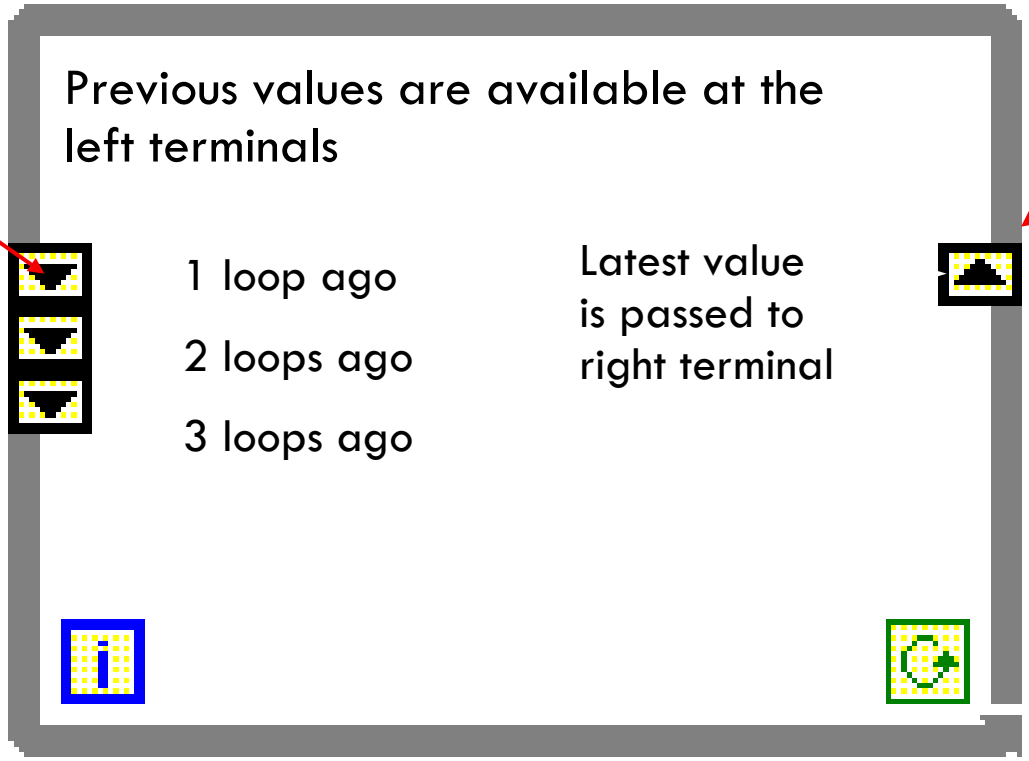
Date precedente in bucla
Registri de deplasare

- Disponibili in stinga si in dreapta pe bordura buclei
- Right-click pe bordura buclei si selectati “Add Shift Register”
- Terminalul din dreapta stocheaza data la terminarea iteratiei
- Terminalul din stinga ofera data stocata la inceputul unei noi iteratii



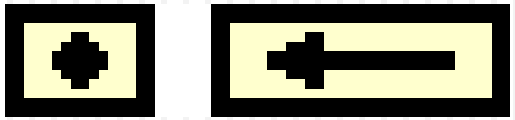
Elemente suplimentare legat de Registrii de Deplasare

Right-click pe terminalul din stinga pentru a aduga mai multe elemente



Right-click pe bordura pentru a aduga un nou registru de deplasare

Noduri de Feedback



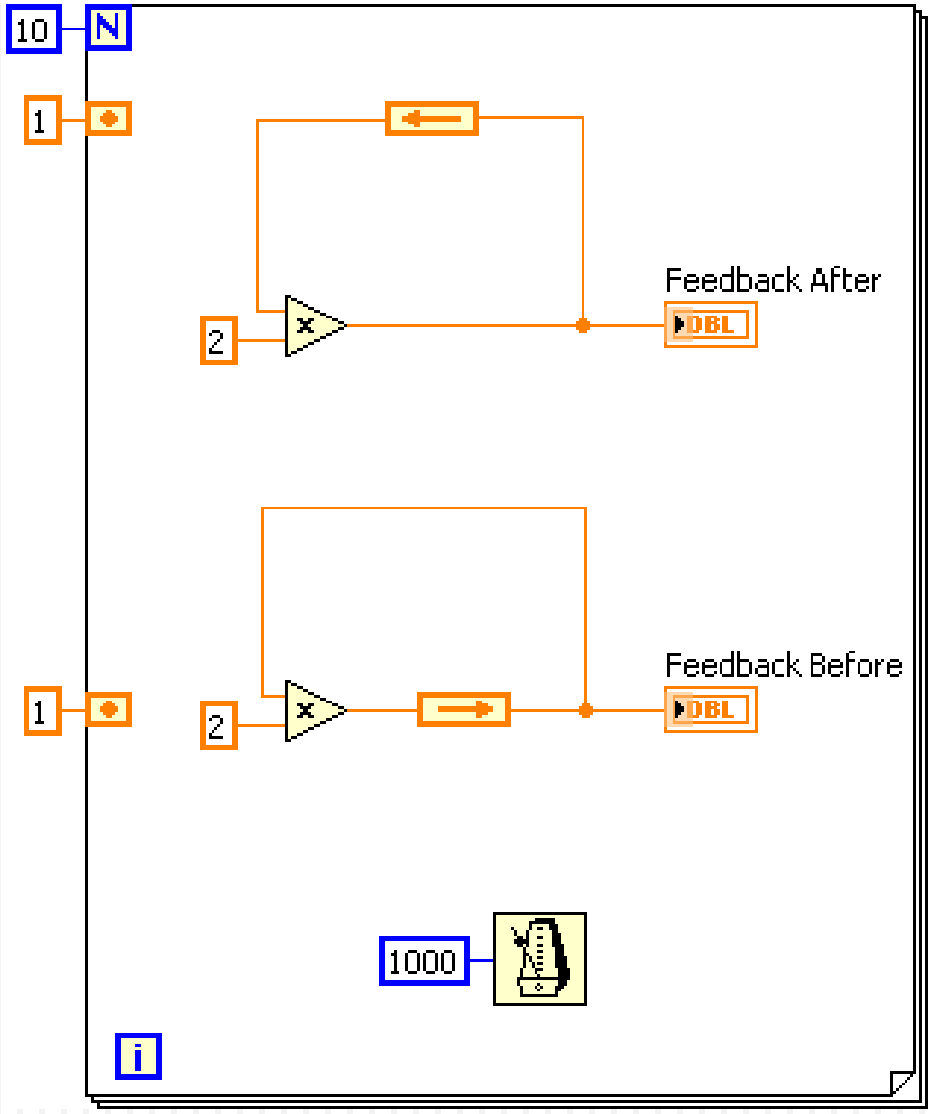
- Apar automat intr-o bucla FOR sau WHILE daca cablam iesirea unui SubVI, functii sau grup de SubVI-uri sau functii la intrarea aceluiasi VI, functie sau grup
- Stocheaza datele cind bucla completeaza o iteratie si trimite aceste date la urmatoarea iteratie a buclei si transfera orice tip de date

Feedback Node

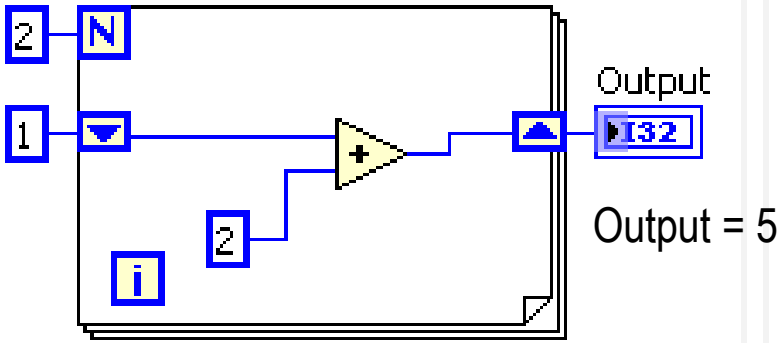
- Legati iesirea cu intrarea pentru a crea automat un “Feedback Node”

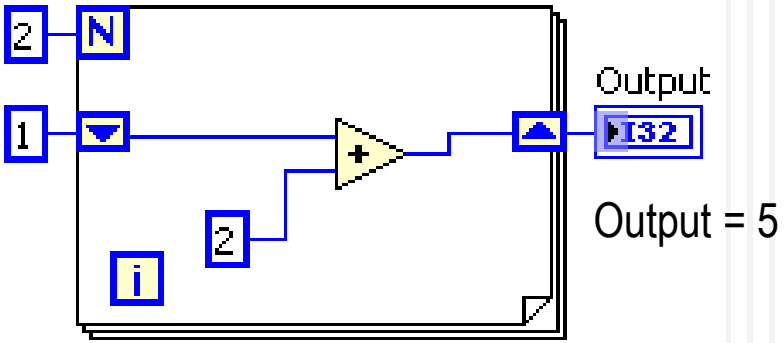
SAU

- Luati un “Feedback node” din paleta **Functions»Structures**

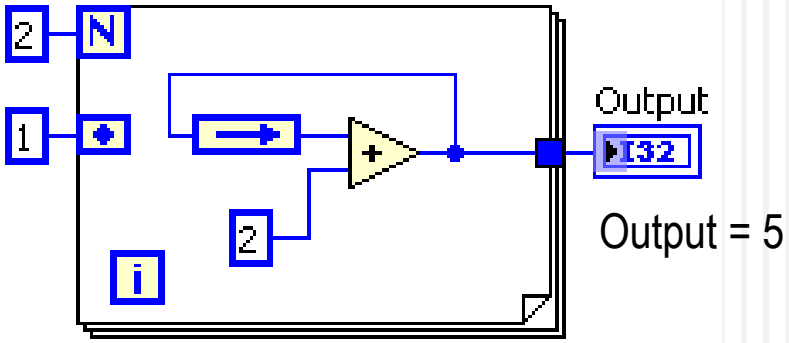


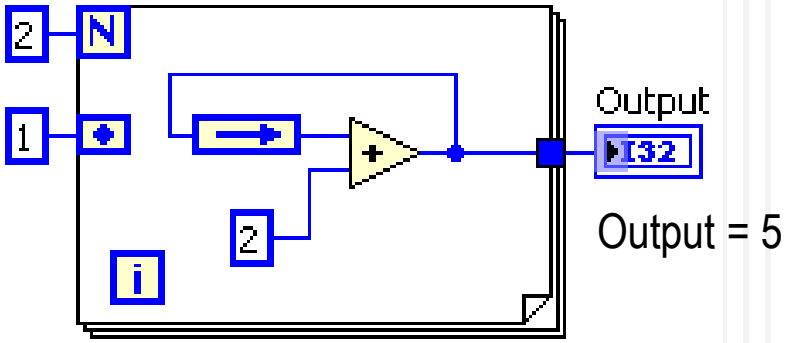
Initializare la: Shift Registers & Feedback Nodes



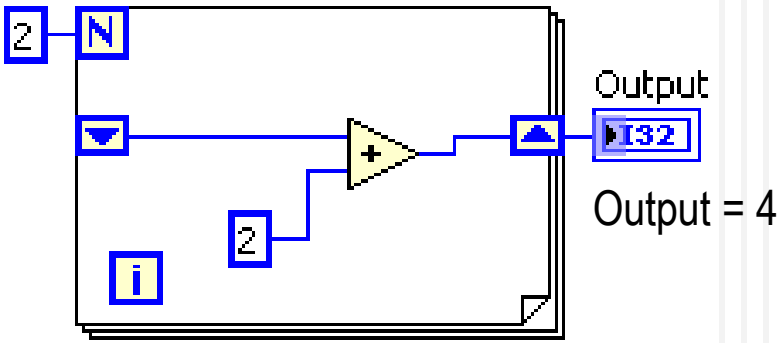


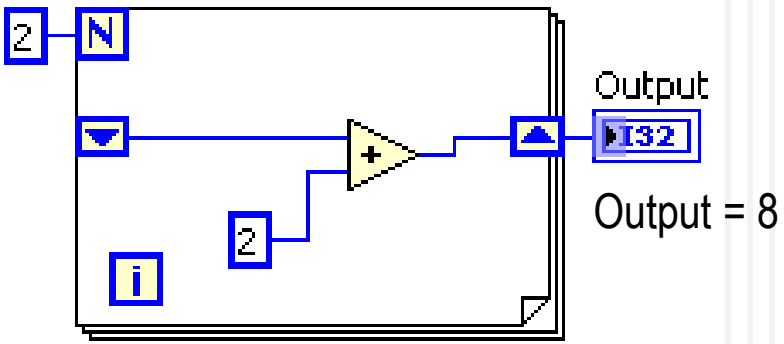
Run Once → VI stops execution → Run Again



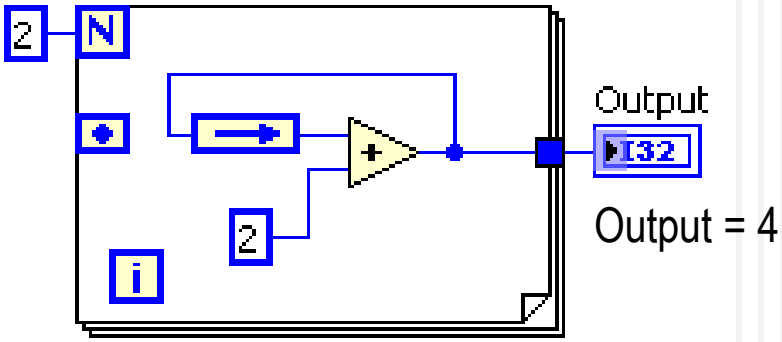


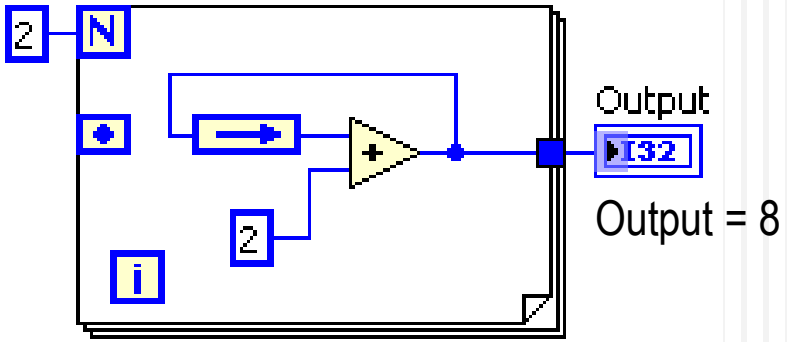
Neinitializat: Shift Registers & Feedback Nodes



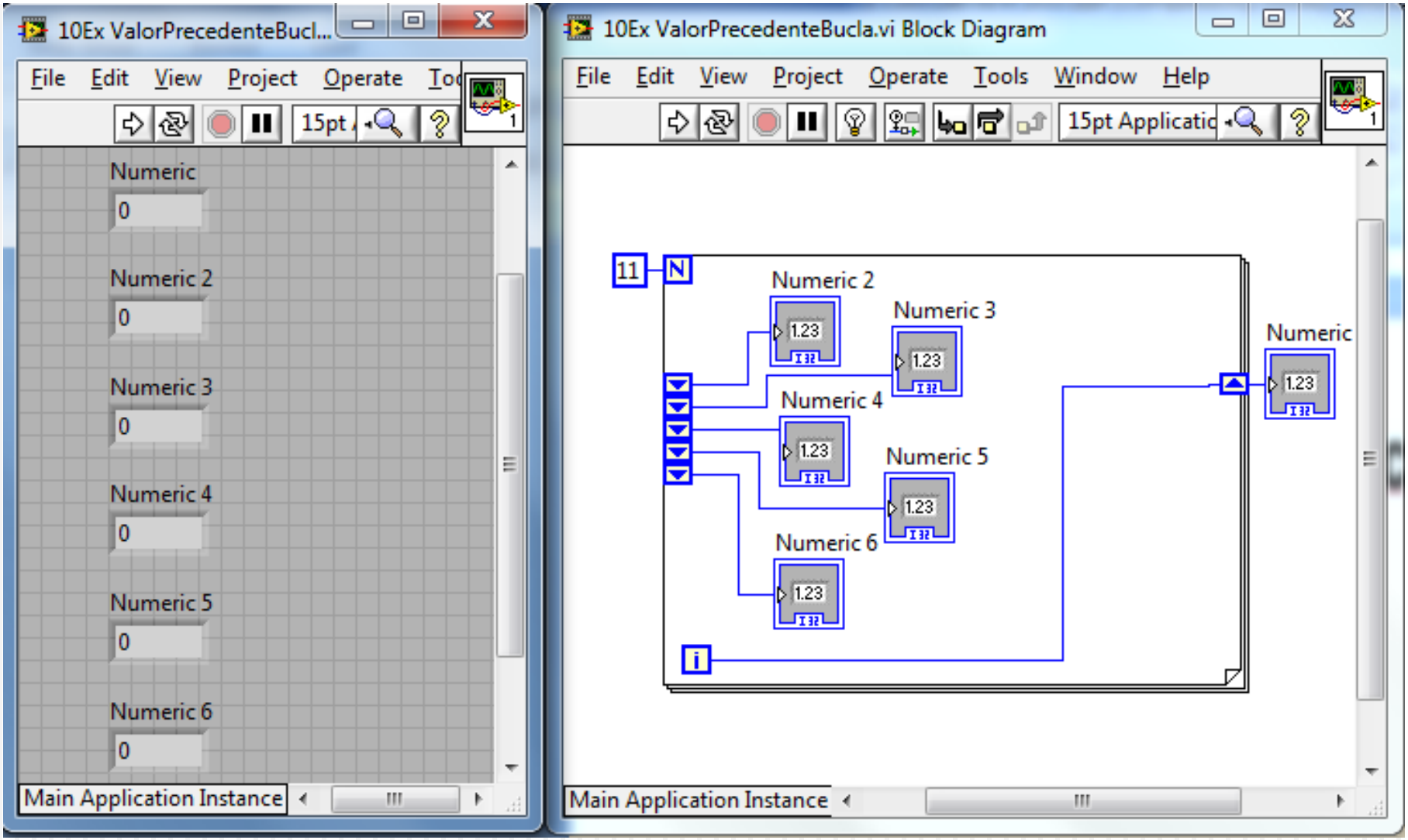


Run Once → VI stops execution → Run Again

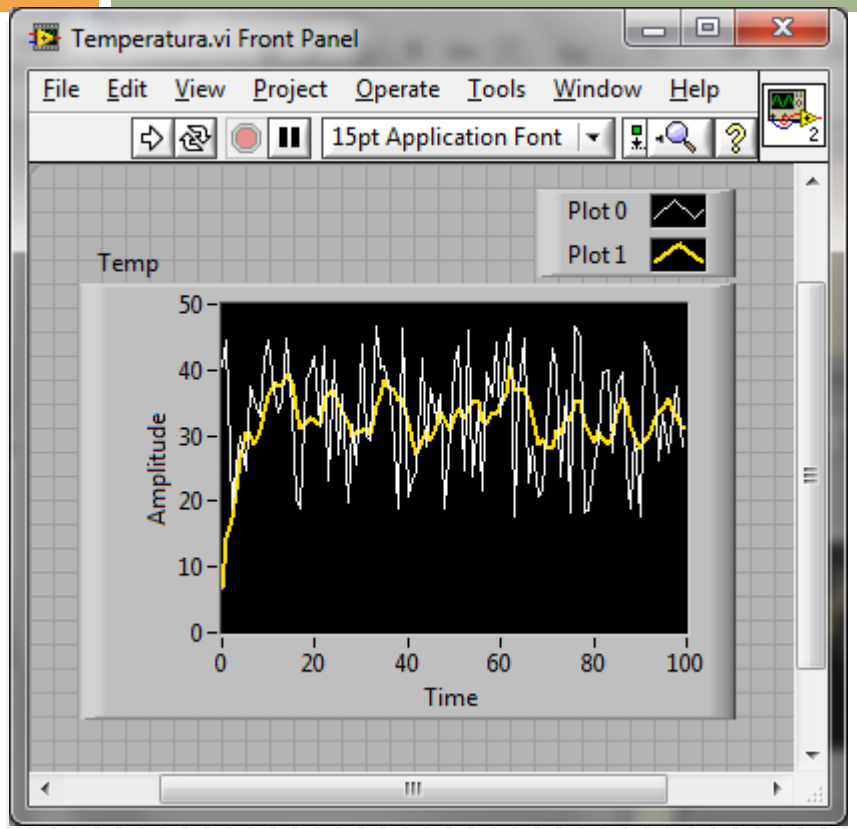




Valori Precedente in Bucla



MEDIERE


Temperatura.vi Front Panel
File Edit View Project Operate Tools Window Help
15pt Application Font
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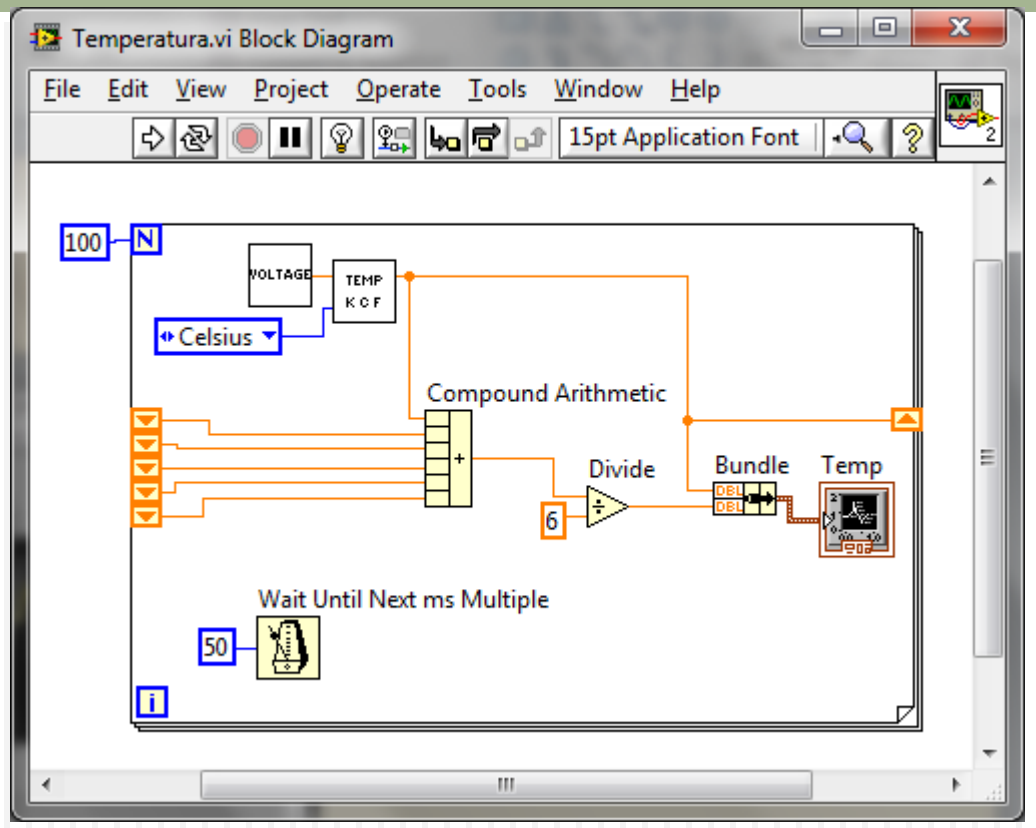
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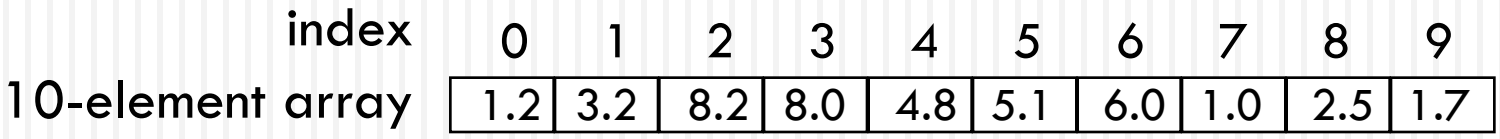
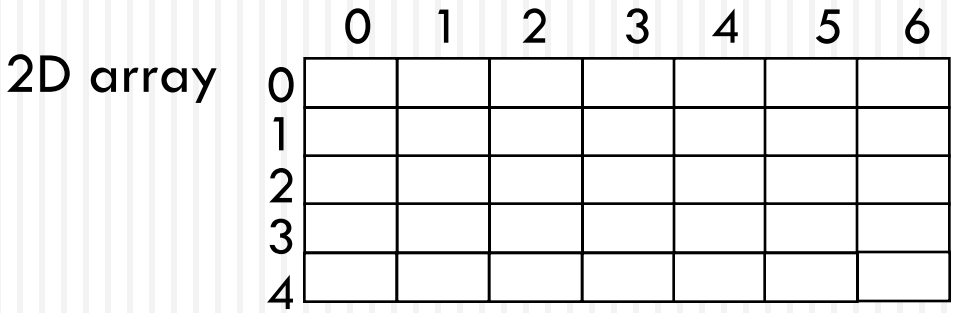
Vectori (Arrays)

Vectori (Arrays)

- Colectii de date care sunt de acelasi tip
- Una sau mai multe dimensiuni, pina la 2^{31} elemente pe dimensiune
- Elementele sunt accesate prin indexul lor; primul element are indexul 0

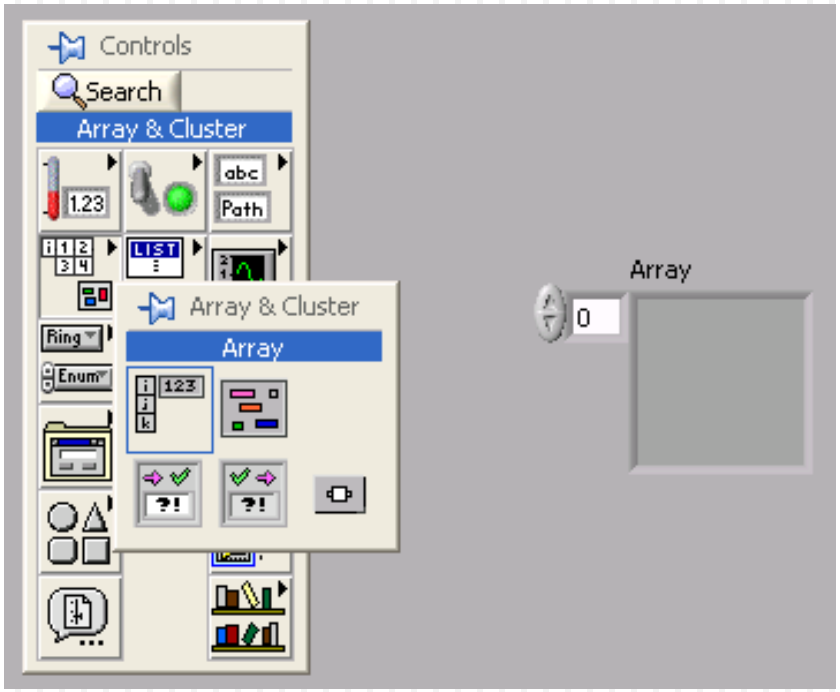




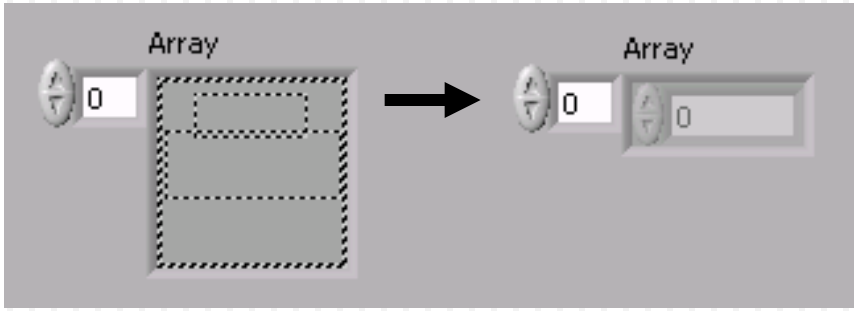
Cinci “linii” cu sapte “coloane” un array de 35 elements

Controale si indicatoare

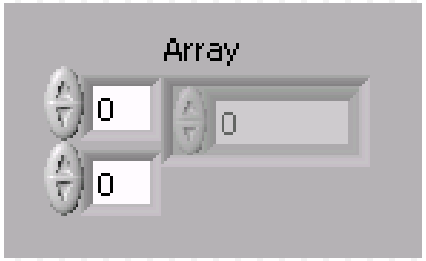
1. Din paleta de Controls selectati rama unui Array



2. Plasati apoi obiectul “data” in aceasta rama

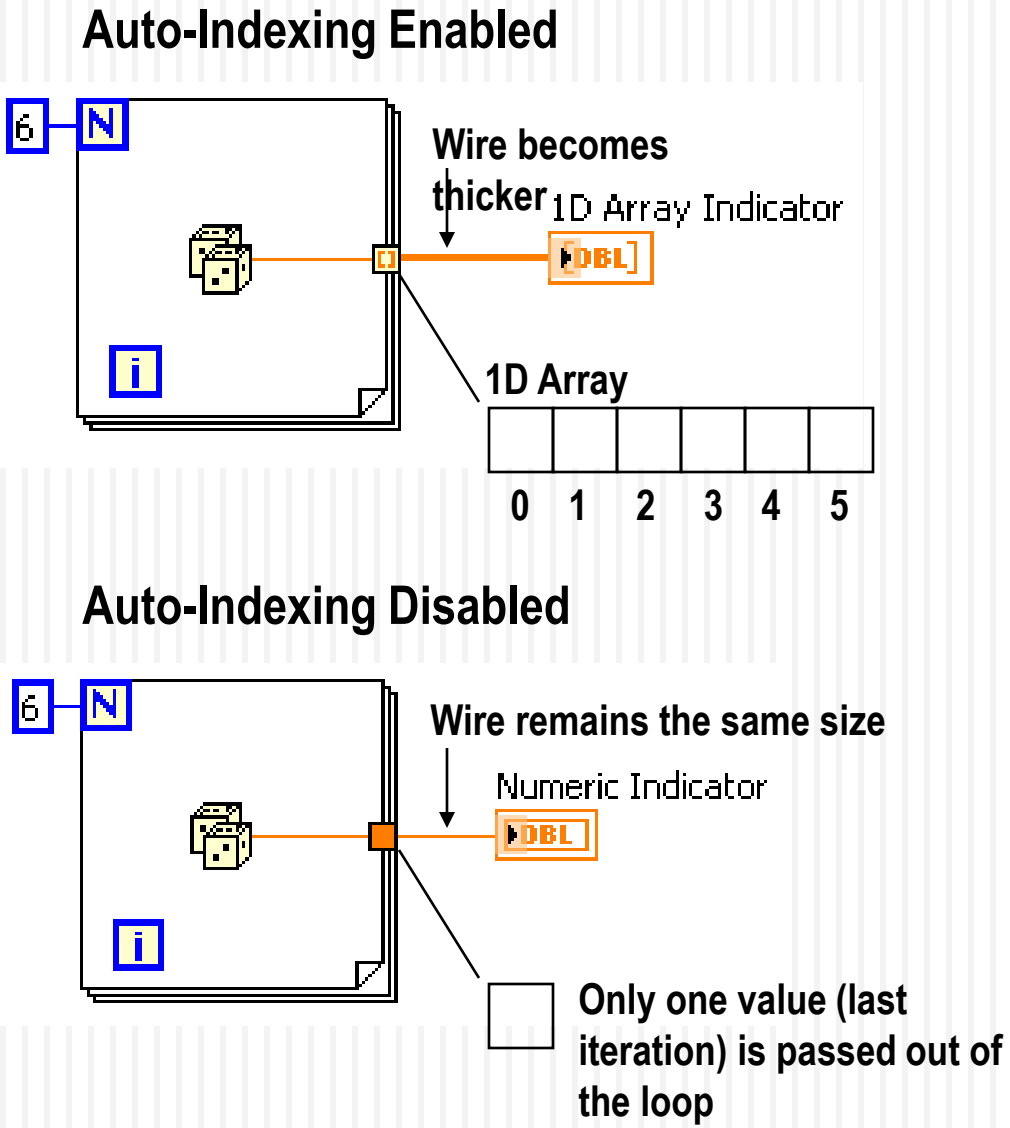


Add Dimension for 2D arrays

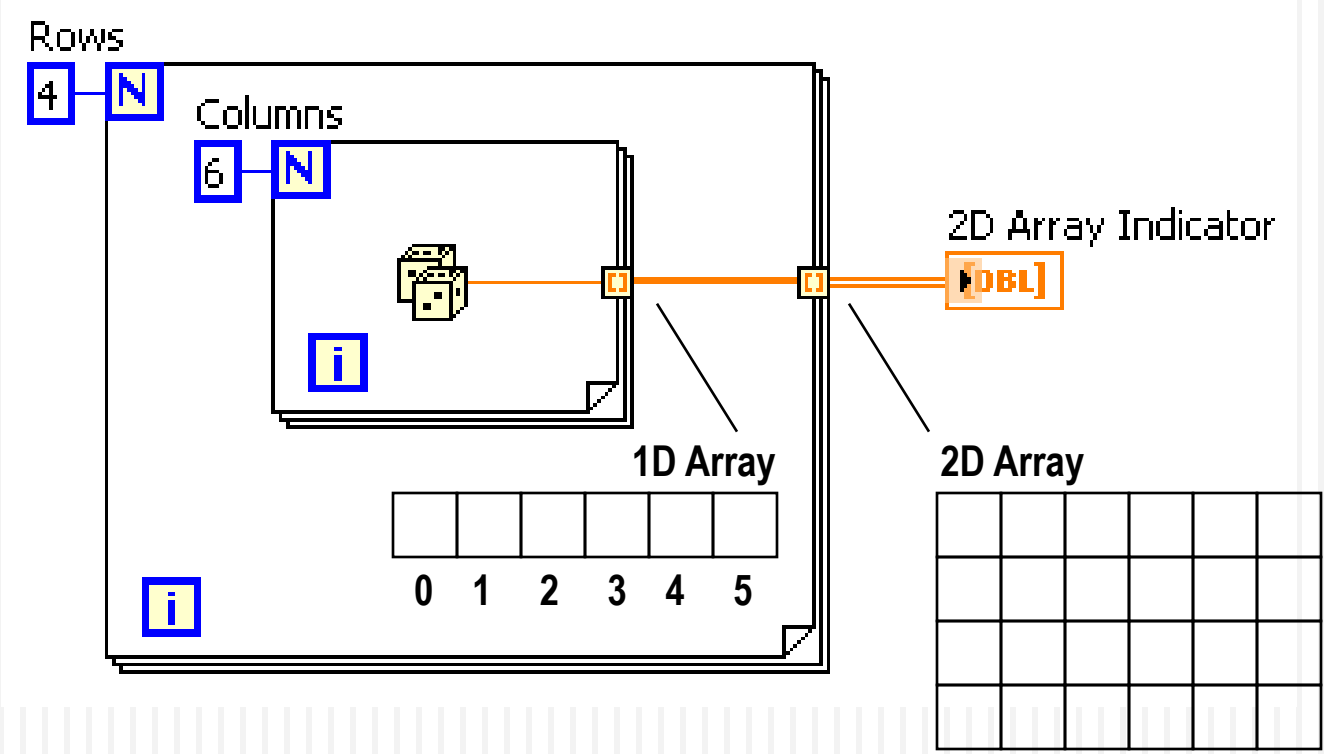


Auto-Indexarea

- Buclele pot sa acumuleze vectori la periferia lor prin auto-indexare
- Buclele For au setat default auto-indexare
- Buclele While retin numai ultima valoare
- Right-click pe tunnel si se poate enabla sau disabla auto-indexarea



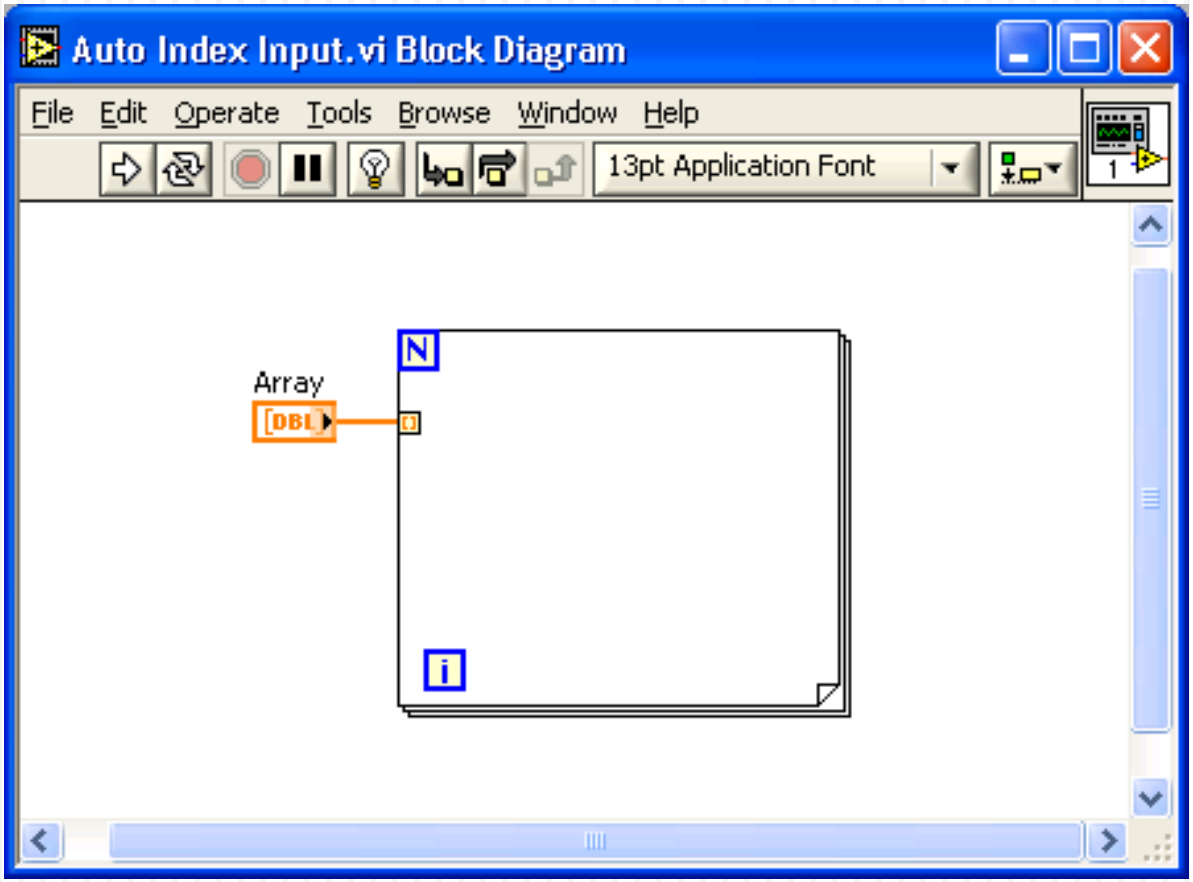
Realizarea de structuri bidimensionale 2D Arrays



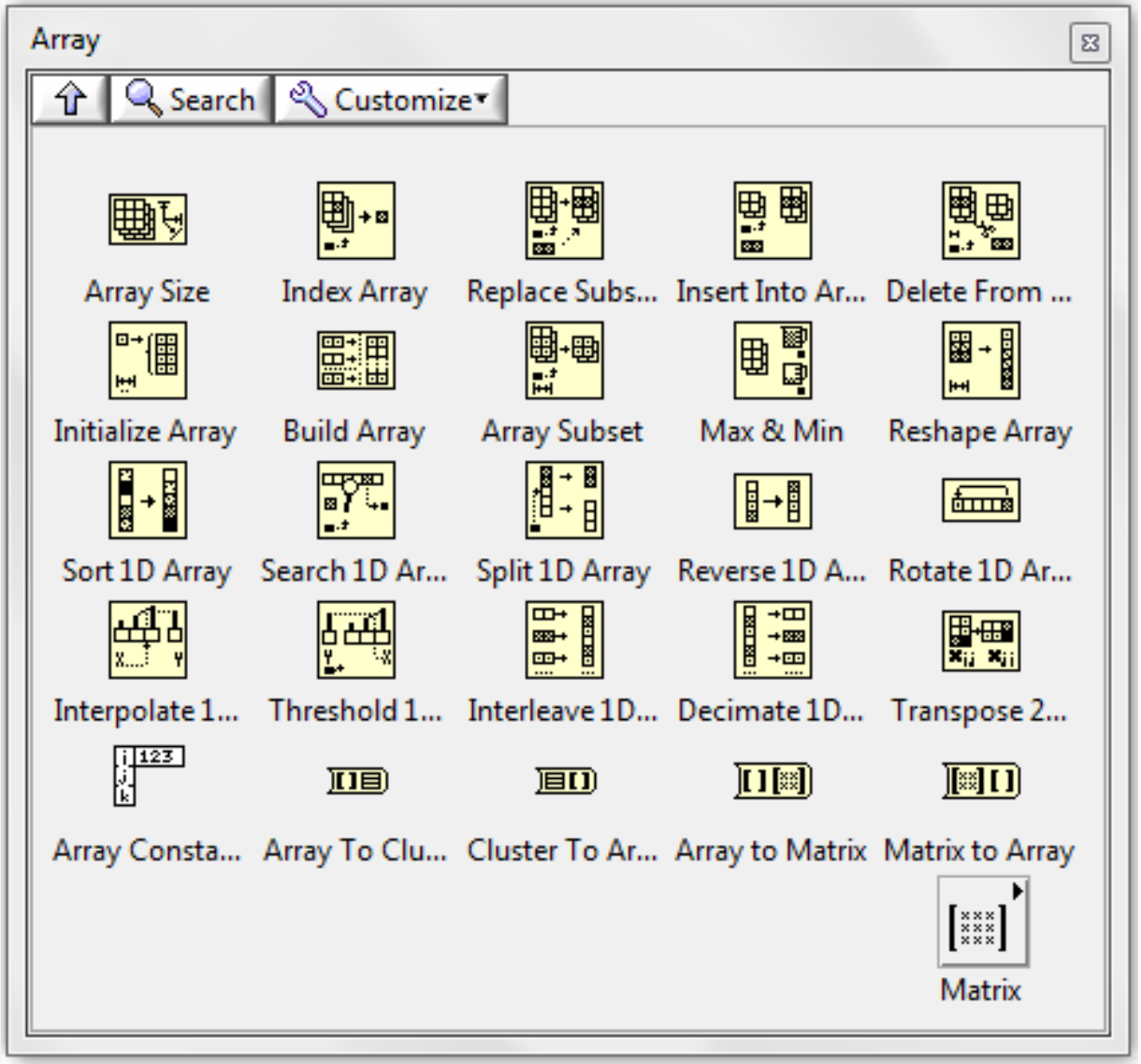
- Bucla interioara creaza elemente de coloana
- Bucla exterioara le aseaza pe rinduri

Auto-indexarea Intrarii

- Un vector cablat la o bucla poate fi folosit ca terminal de contorizare al buclei
- Numarul de elemente din vector este egal cu constanta elementului de contorizare
- Sageata de rulare nu este intrerupta !



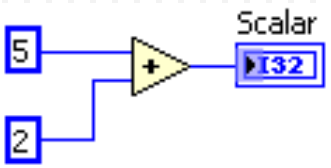
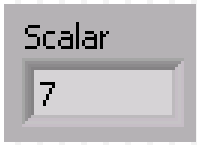
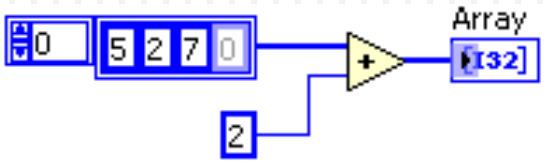
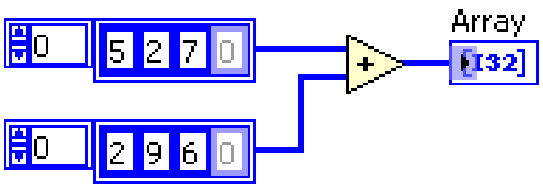
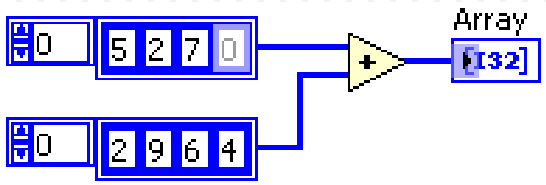
Functii specifice pentru Array



D. Polimorfism

Functiile de intrare pot fi de tipuri diferite

Toate functiile aritmetice din LabVIEW sunt polimorfice

Combination		Result	
Scalar + Scalar		Scalar	
Array + Scala		Array	
Array + Array		Array	
Array + Array		Array