INTRODUÇÃO À PROGRAMAÇÃO

Aula 16

Arranjo de Estruturas

Um arranjo de estruturas são compostos de estruturas. Essa classe de arranjo permite armazenar arranjos diferentes juntos.

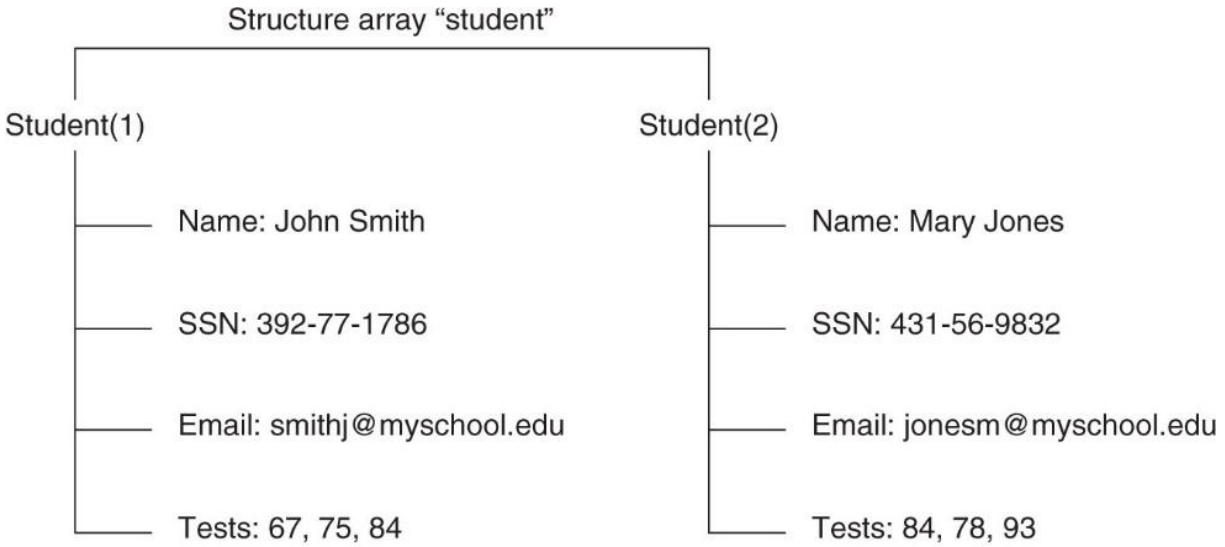

Figure 2.7–1 Arrangement of data in the structure array `student`.

Arranjo de Estruturas

Diferente do arranjo de células, neste caso os elementos nas estruturas são acessados utilizando-se campos nomeados

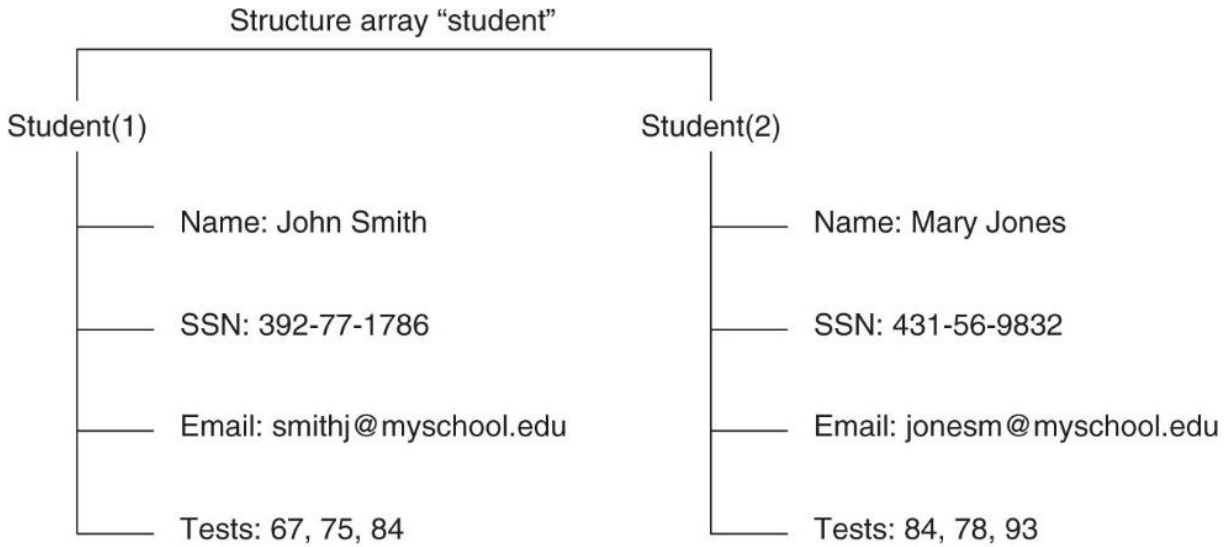

Figure 2.7–1 Arrangement of data in the structure array `student`.

student.name = 'John Smith' → 1 arranjo de várias estruturas

Arranjo celular - student(1,1) = {'John Smith'};
student{1,1} = ' 'John Smith '; → 1 arranjo de várias células

Arranjo de Estruturas

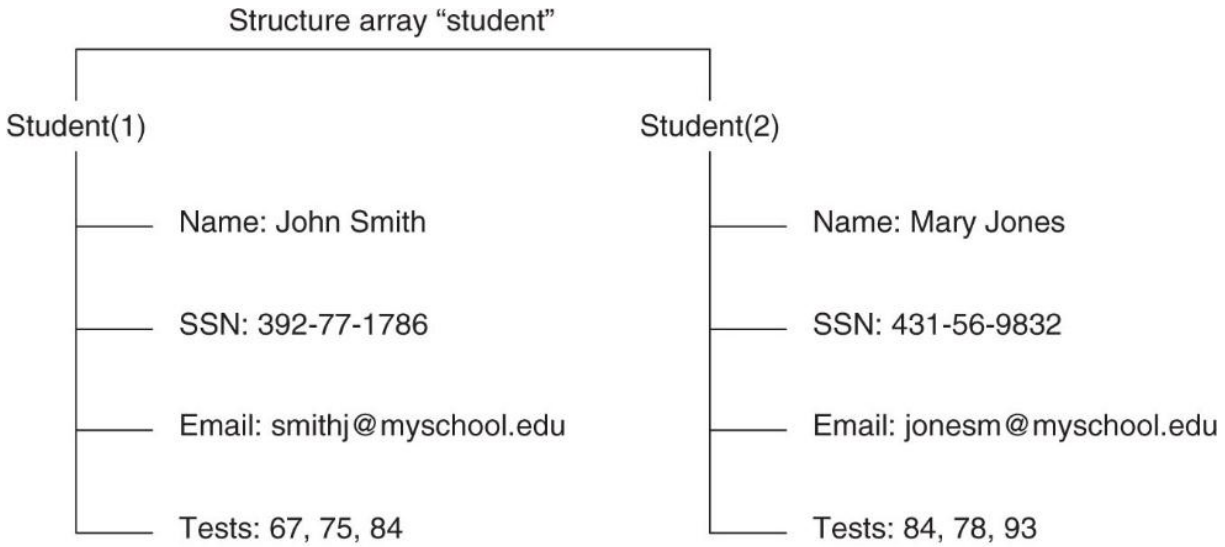

Figure 2.7–1 Arrangement of data in the structure array `student`.

```
>> student.name = 'John Smith';
>> student.SSN = '392-77-1786';
>> student.email = 'smithj@myschool.edu';
>> student.tests = [67,75,84];
```

Arranjo de Estruturas

```
>> student

student =

  struct with fields:

     name: 'John Smith'
      SSN: '392-77-1786'
    email: 'smithj@myschool.edu'
    tests: [67 75 84]
```

Arranjo de Estruturas

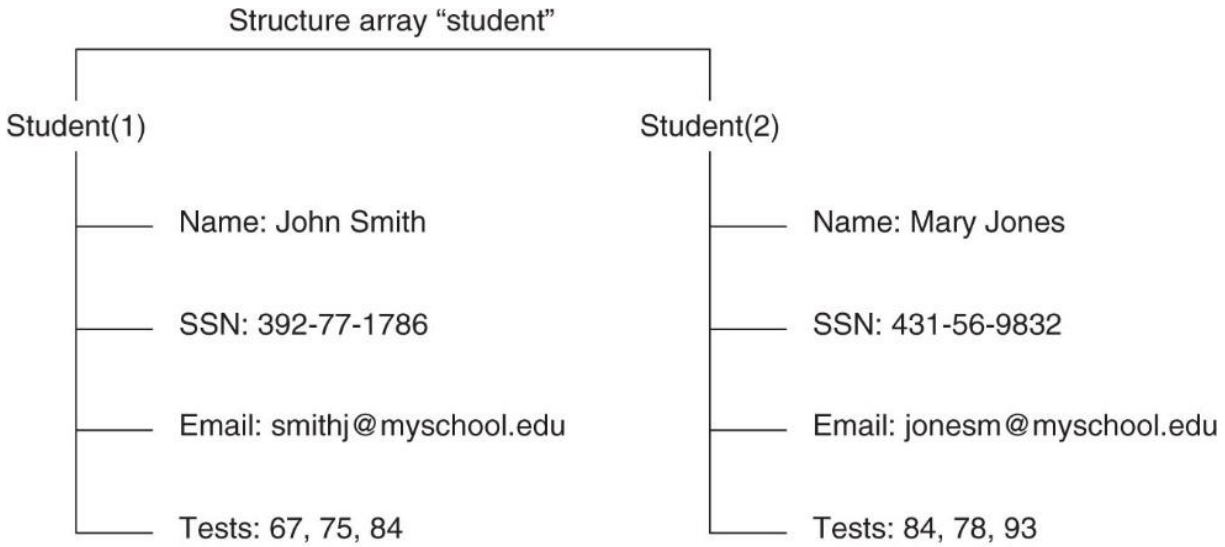

Figure 2.7–1 Arrangement of data in the structure array `student`.

Arranjo de Estruturas

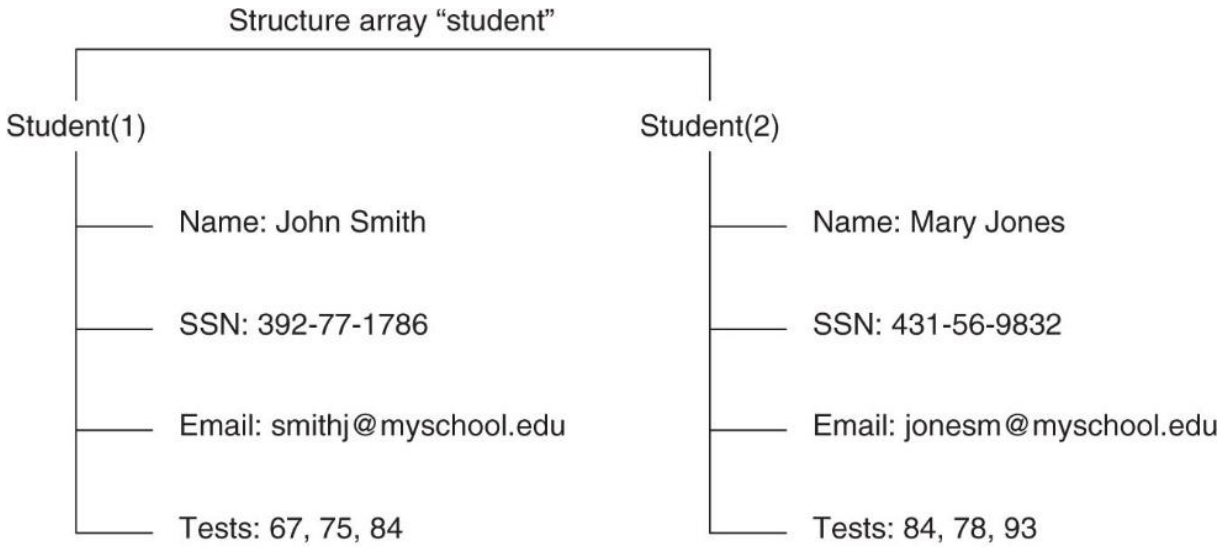

Figure 2.7–1 Arrangement of data in the structure array `student`.

```
>> student(2).name = 'Mary Jones';
>> student(2).SSN = '431-56-9832';
>> student(2).email = 'jonesm@myschool.edu';
>> student(2).tests = [84,78,93];
```

Arranjo de Estruturas

```
>> student

student =

  1×2 struct array with fields:

    name
    SSN
    email
    tests
```

Arranjo de Estruturas

size(a) – retorna a dimensão do arranjo a

```
>> size(student)

ans =

    1     2
```

length(a) – retorna o tamanho do arranjo a

```
>> length(student)

ans =

     2
```

Arranjo de Estruturas

fieldnames(a) – retorna os nomes dos campos associados à estrutura S, o resultado é um arranjo de células de strings.

```
>> fieldnames(student)
ans =

  4×1 cell array

    'name'
    'SSN'
    'email'
    'tests'

>> n = fieldnames(student)
n =

  4×1 cell array

    'name'
    'SSN'
    'email'
    'tests'
```

Arranjo de Estruturas

struct(‘f1’, ‘v1’, ‘f2’, ‘v2’,...) – cria um arranjo de estruturas com os campos ‘f1’, ‘f2’, ... Que contêm os valores ‘v1’, ‘v2’, ...

```
>> clear
>> student = struct('name','Jhon Smith','SSN','392-77-1786','email', ...
'smithj@mayschool.edu', 'tests',[67, 75, 84])

student =

  struct with fields:

     name: 'Jhon Smith'
      SSN: '392-77-1786'
    email: 'smithj@mayschool.edu'
    tests: [67 75 84]
```

Acessando Arranjo de Estruturas

```
>> student(2).name
ans =

Mary Jones

>> n = student(2).name
n =

Mary Jones

>> nota2_Jhon = student(1).tests(2)

nota2_Jhon =

   75
```

Acessando Arranjo de Estruturas

```
>> M = student(2)
M =

  struct with fields:

     name: 'Mary Jones'
      SSN: '431-56-9832'
    email: 'jonesm@myschool.edu'
    tests: [84 78 93]

>> M(2).name = 'Carlos'
M =

  1×2 struct array with fields:

    name
    SSN
    email
    tests
```

Modificando estruturas

```
>> student(2)
ans =

  struct with fields:

     name: 'Mary Jones'
      SSN: '431-56-9832'
    email: 'jonesm@myschool.edu'
    tests: [84 78 93]

>> student(2).tests(3) = 98
>> student(2)
ans =

  struct with fields:

     name: 'Mary Jones'
      SSN: '431-56-9832'
    email: 'jonesm@myschool.edu'
    tests: [84 78 98]
```

Modificando estruturas

```
>> student(1).phone = '555-1659';
>> student(1)

ans =

  struct with fields:

     name: 'Jhon Smith'
      SSN: '392-77-1786'
    email: 'smithj@mayschool.edu'
    tests: [67 75 84]
    phone: '555-1659'
```

```
>> student(2)

ans =

  struct with fields:

     name: 'Mary Jones'
      SSN: '431-56-9832'
    email: 'jonesm@myschool.edu'
    tests: [84 78 98]
    phone: []
```

Modificando estruturas

rmfield(S, ‘field’) – remove o campo ´field’ da estrutura S

```
>> student
student =

 struct with fields:

    name: 'John Smith'
     SSN: '392-77-1786'
   email: 'smithj@myschool.edu'
   tests: [67 75 84]


>> rmfield(student,'SSN')
ans =

  struct with fields:

     name: 'John Smith'
    email: 'smithj@myschool.edu'
    tests: [67 75 84]
```

Modificando estruturas

rmfield(S, ‘field’) – remove o campo ´field’ da estrutura S

```
>> new_student = rmfield(student,'SSN')

new_student =

  1×2 struct array with fields:

    name
    email
    tests
    phone
```

```
>> student

student =

  1×2 struct array with fields:

    name
    SSN
    email
    tests
    phone
```

Utilizando operadores e funções com estruturas

```
>> student(2).tests

ans =

   84    78    98

>> max(student(2).tests)

ans =

   98

>> min(student(2).tests)

ans =

   78
```

Utilizando operadores e funções com estruturas

isfield(S, ‘field’) – Retorna 1 se ´field’ for o nome de um campo na estrutura S, ou 0 em caso contrário

```
>> isfield(student,'name')
ans =

  logical

   1
```

isstruct(S) – Retorna 1 se o arranjo S for um arranjo de estruturas, ou 0 em caso contrário

```
>> isstruct(student)
ans =

  logical

   1
```