Characters and Strings

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Fall 2023

last formatted: February 6, 2024

Strings

1. Create string of length

```
character(len=50) :: mystring
mystring = "short string"
```

2. String length

String length, with / without trimming.

Code:

```
1 // stringf/quote.F90
2 character(len=12) :: strvar
3   /* ... */
4 strvar = "word"
5 print
      *,len(strvar),len(trim(strvar))
```

Output:

```
          12           4
```

3. String concatenation

Code:

```
1 // stringf/quote.F90
2 character(len=10) ::
      firstname,lastname
3 character(len=15) ::
      shortname,fullname
4   /* ... */
5 firstname = "Victor"; lastname =
      "Eijkhout"
6 shortname = firstname // lastname
7 print *,"without trimming:
      ",shortname
8 fullname = trim(firstname) // " "
      // trim(lastname)
9 print *,"with trimming: ",fullname
```

Output:

```
without trimming:
    Victor    Eijkh
with trimming: Victor
    Eijkhout
```

Formatting

4. Integer formatting

Code:

```
1 // iof/format.F90
2 i = 56
3 print *,i
4 print '(i4)',i
5 print '(i2)',i
6 print '(i1)',i
7 i = i*i
8 print '("fit <",i0,"> ted")',i
```

Output:

```
          56
  56
56
*
fit <3136> ted
```

5. String formatting

String in the format spec:

```
print '(i2,"--",i2)', m,n
```

Explicit `a` specifier:

```
print '(a5,i2)',somestring,someint
```

Use only the required space:

```
print '(a,i0,a)', str1,int2,str3
```

6. Repeated formats

Code:

```
1 // iof/format.F90
2 i = 12; j = 34
3 print '(2i4)',i,j
4 print '(2i2)',i,j
```

Output:

```
  12  34
1234
```

Code:

```
1 // iof/format.F90
2 i = 23; j = 45; k = 67
3 print '(i2,1x,i2)',i,j
4 print '("Numbers:",3(1x,i2,"."))',
      i,j,k
```

Output:

```
23 45
Numbers: 23. 45. 67.
```

Character conversion

7. Conversion char to ascii

Code:

```
1 // stringf/convert.F90
2 print *,"97 is a:",char(97)
3 print *,"84 is T:",char(84)
4 print *,"53 is 5:",char(53)
5 print *,"11 is VT :",char(11),"."
```

Output:

```
 97 is a:a
 84 is T:T
 53 is 5:5
 11 is VT :
          .
```

Note the last one!

8. Ascii code of a character

```
character :: char
integer :: code

char = "x"
code = iachar(char)
print *,char," has code",code
```

Exercise 1

Write a test to see if a character is lowercase:

Code:

```
1 // stringf/convert.F90
2 print *,"lower t",islower("t")
3 print *,"lower T",islower("T")
4 print *,"lower 3",islower("3")
```

Output:

```
 lower t T
 lower T F
 lower 3 F
```

Similarly, write a test *isdigit*.

String conversion

9. Read / Write

Fortran `Read` / `Write`:

```
Read( fromwhere, how ) what
Write( towhere, how ) what
```

with

- *from/towhere* is a 'unit', meaning file, and * is terminal;
- or *from/towhere* is a character string;
- *how* is a format string
- *what* is a bunch of variables

10. Parse date string

Code:

```
1 // stringf/readwrite.F90
2 character(len=8) :: date
3 integer :: year,month,day
4 date = "20221027"
5 read( date,'( i4,i2,i2 )' ) &
6      year,month,day
7   /* ... */
8 print *,"Date:",date
9 print '( "Year=",i4,", mo=",i2,",
      day=",i2 )', &
10      year,month,day
```

Output:

```
 Date:20221027
Year=2022, mo=10, day=27
```

11. Date quantities to string

Code:

```
1 // stringf/readwrite.F90
2 character(len=10) :: longdate
3   /* ... */
4 write( longdate,&
5      '( i4,"/",i2,"/",i2 )' &
6      ) year,month,day
7 print *,"Long date:",longdate
```

Output:

```
Long date:2022/10/27
```