

Strings

COMP 1002/1402

Strings

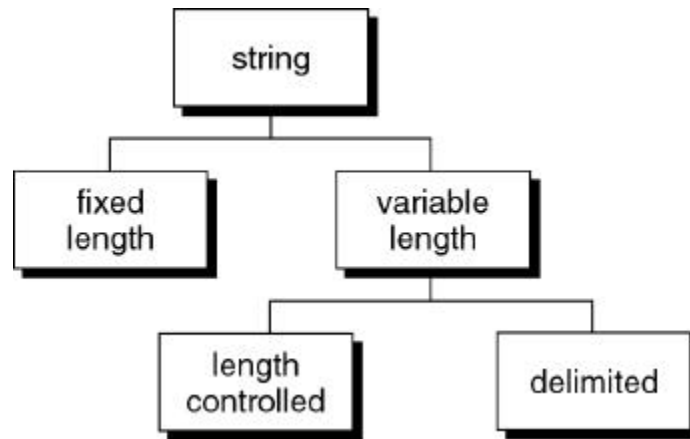
Strings are sequences of characters

So frequently used that **char[]** is not enough

C offer “a little” more than **char[]**

Mainly literals & functions

Two Classes, Three Types



Two Classes, Three Types

String:

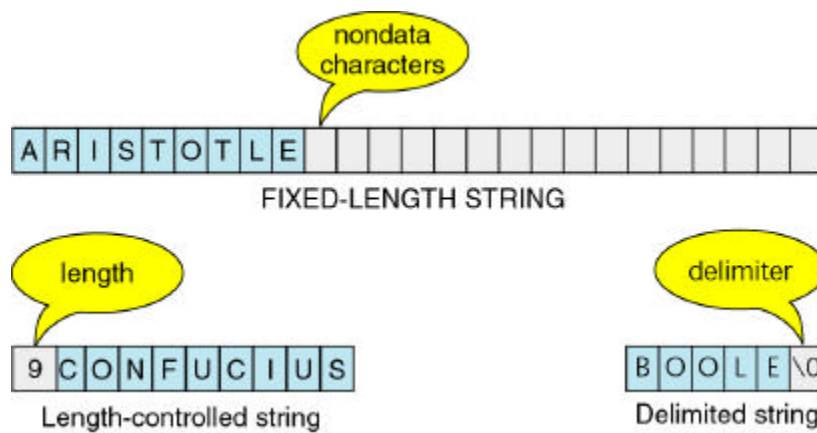
Fixed length – known length in advance

Variable length – may change at runtime

Length controlled – length stored

Delimited – end of string is delimited

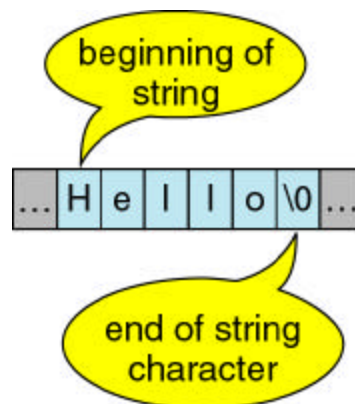
Examples



Storing Strings in C

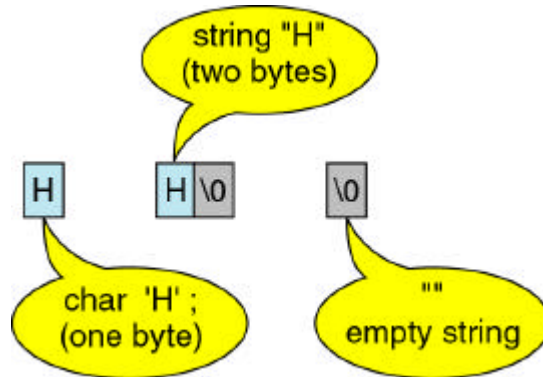
Strings are:

- Stored in array of chars
- Terminated with '**\0**'



Every char is 1 byte

Therefore every string requires one extra byte



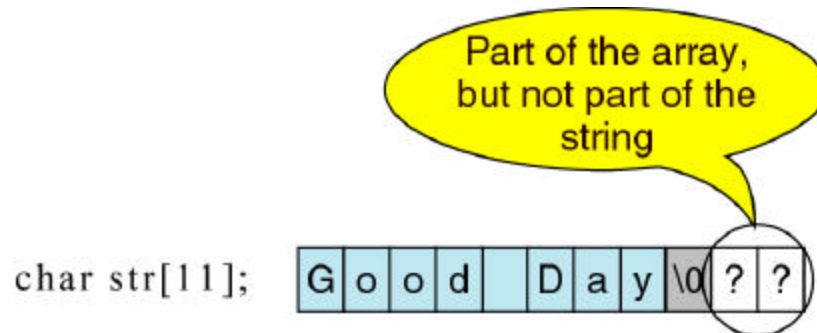
Strings and char[]

Strings are stored in arrays of char

Array of chars does not need '**\0**' Strings do!



Strings in Arrays



String Literals

Examples:

"C is a great language"

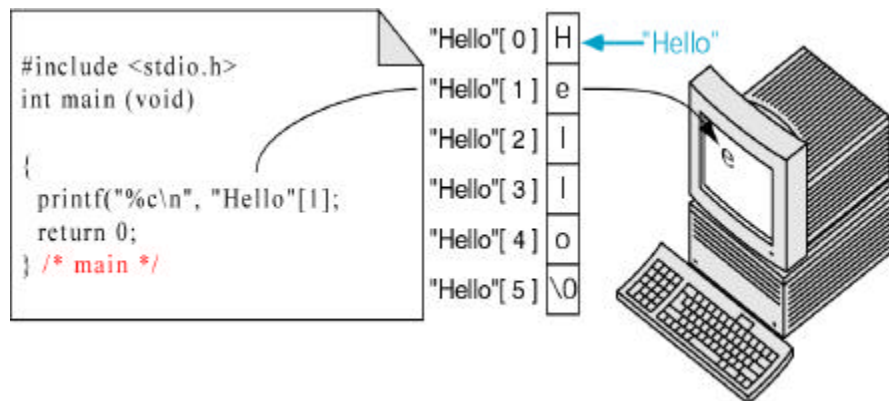
"This is a string literal"

"Anything in double quotes"

String literals are:

constant char *

String Literal References



String Variables

Always declare the extra byte!

Need 10 chars? Declare 11!

```
char str[11];
```

Initialization

Only possible at declaration!

The hard way:

```
char str[11] = {'G', 'o', 'o', 'd', ' ',  
               'D', 'a', 'y', '!', '\0'};
```

The easy way:

```
char str[11] = "Good Day!";
```

Alternate Initialization

```
char month[] = "January";  
char *pstr = "Good Day!";  
char str[10] = "Good Day!";
```

month →

J	a	n	u	a	r	y	\0
---	---	---	---	---	---	---	----

"Good Day!" →

G	o	o	d		D	a	y	!	\0
---	---	---	---	--	---	---	---	---	----

pStr 

str →

G	o	o	d		D	a	y	!	\0
---	---	---	---	--	---	---	---	---	----

Strings and Assignment

```
char str1[11] = "Hello";  
char str2[11];  
str2 = str1; /* compile error */
```

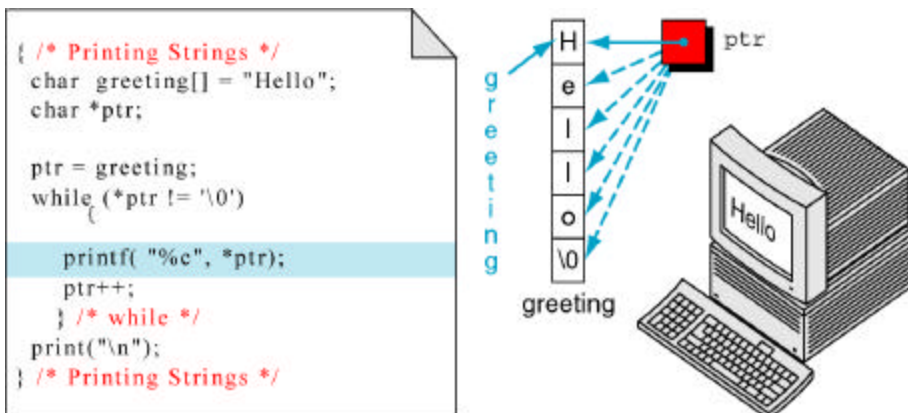
Problems:

How to print?

How to copy?

How to concatenate?

Printing the Hard Way



Revisiting **scanf**

String Conversion Code **%s**

```
char month[10];  
scanf("%s", month);
```

Better to use:

```
scanf("%9s", month);
```

Read Month Example

```
{  
  #define FLUSH while (getchar() != '\n')  
  char month[10];  
  
  printf("Please enter a month. ");  
  scanf("%9s", month);  
  FLUSH;  
} /* Read Month */
```

Revisiting **scanf**

Edit Set Conversion Code **%[...]**

```
char str[11];  
scanf ("%10[0123456789.,$]", month);  
scanf ("%10[^\n]");
```

Define the characters to accept or decline

Accept or Decline

%[abcdef0987654321] accepts Hex digits

%[^abc] declines only 'a','b','c' characters

```

#include <stdio.h>
int main(void) {
    int amount;
    do {
        printf("Enter <integer> <integer> <float>: ");
        scanf("%*d%d%*[^\\n]", &amount);
        printf("Second Integer: %d\\n",amount);
    } while (amount >=0);
    printf("\\nThank You\\n");
    return 0;
} /* main */

```

Revisiting **printf**

```

char *str ="Example";
printf("l%30sr\\n", str);

```

Prints:

```

l                               Exempler

```

```

printf("l%30sr\\n", str);

```

Prints:

```

lExample                               r

```