Strings

Advanced C

S_____s - Fill in the blanks please ;)

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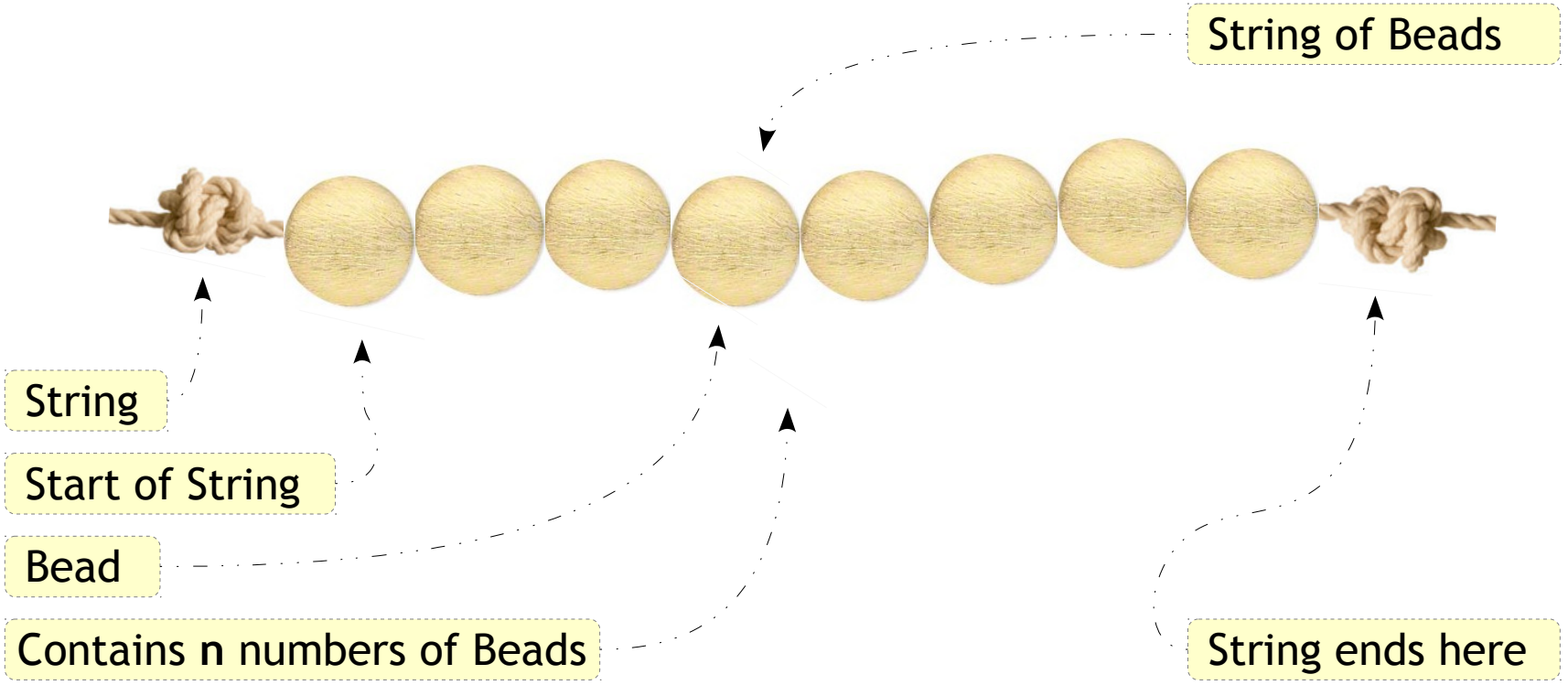
Strings

A set of things tied or threaded together on a thin cord

Source: Google



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Strings

- Contiguous sequence of characters
- Stores printable ASCII characters and its extensions
- End of the string is marked with a special character, the null character '\0'
- '\0' is implicit in strings enclosed with “”
- Example

“You know, now this is what a string is!”

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Strings - Initializations

Examples

```
char char_array[5] = {'H', 'E', 'L', 'L', 'O'};
```
Character Array

```
char str[6] = {'H', 'E', 'L', 'L', 'O', '\0'};
```
String

```
char str[] = {'H', 'E', 'L', 'L', 'O', '\0'};
```
Valid

```
char str[6] = {"H", "E", "L", "L", "O"};
```
Invalid

```
char str[6] = {"H" "E" "L" "L" "O"};
```
Valid

```
char str[6] = {"HELLO"};
```
Valid

```
char str[6] = "HELLO";
```
Valid

```
char str[] = "HELLO";
```
Valid

```
char *str = "HELLO";
```
Valid

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Strings - Memory Allocation

Examples

```
char str1[] = {'H', 'E', 'L', 'L', 'O', '\0'};
char *str2 = "Hello";
```

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Strings - Size

Examples

```c
#include <stdio.h>

int main()
{
    char char_array_1[5] = {'H', 'E', 'L', 'L', O'};
    char char_array_2[] = "Hello";

    sizeof(char_array_1);
    sizeof(char_array_2);

    return 0;
}
```

The size of the array Is calculated So,

5, 6

```c
int main()
{
    char *str = "Hello";

    sizeof(str);

    return 0;
}
```

The size of pointer is always constant so,

4 (32 Bit Sys)

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Strings - Size

Example

```
#include <stdio.h>

int main()
{
    if (sizeof("Hello" "World") == sizeof("Hello") + sizeof("World"))
    {
        printf("WoW\n");
    }
    else
    {
        printf("HuH\n");
    }


    return 0;
}
```

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Strings - Manipulations

Examples

```
char str1[6] = "Hello";
char str2[6];

str2 = "World";
```

Not possible to assign a string to a array since its a constant pointer

```
char *str3 = "Hello";
char *str4;

str4 = "World";
```

Possible to assign a string to a pointer since its variable

```
str1[0] = 'h';
```

Valid. str1 contains “hello”

```
str3[0] = 'w';
```

Invalid. str3 might be stored in read only section. Undefined behaviour

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Strings - Sharing

Example

```
#include <stdio.h>

int main()
{
    char *str1 = "Hello";
    char *str2 = "Hello";

    if (str1 == str2)
    {
        printf("Hoo. They share same space\n");
    }
    else
    {
        printf("No. They are in different space\n");
    }

    return 0;
}
```

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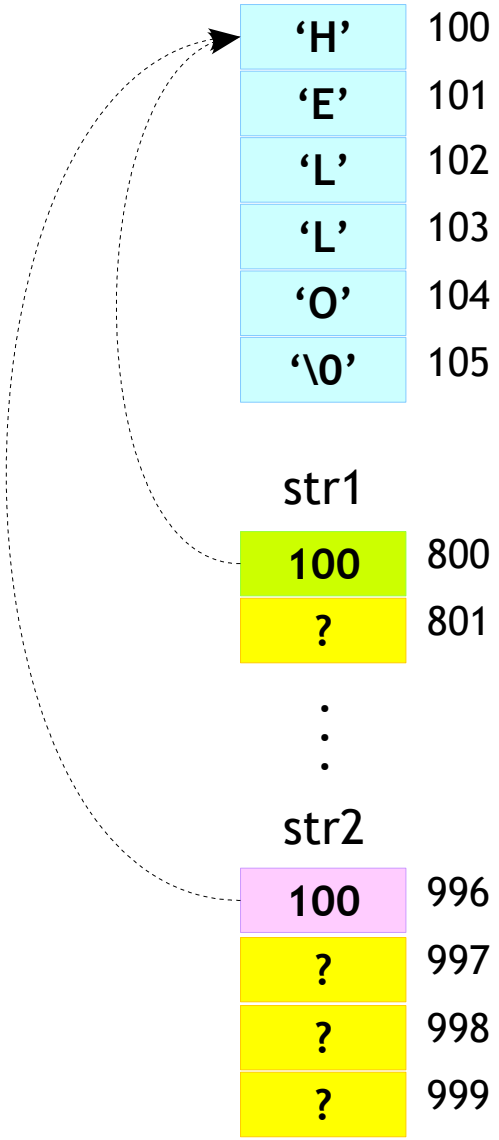
Strings - Sharing



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Strings - Empty String

Example

```c
#include <stdio.h>
#include <string.h>

int main()
{
    char *str = "";
    int ret;

    ret = strlen(str);
    printf("%d\n", ret);

    return 0;
}
```

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Strings - Passing to Function

Example

```
#include <stdio.h>

void print(const char *str)
{
    while (*str)
    {
        putchar(*str++);
    }
}

int main()
{
    char *str = "Hello World";

    print(str);

    return 0;
}
```

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Strings - Reading

Example

```
#include <stdio.h>

int main()
{
    char str[6];

    gets(str);
    printf("The string is: %s\n", str);

    return 0;
}
```

- The above method is not recommend by the gcc. Will issue warning while compilation
- Might lead to stack smashing if the input length is greater than array size!!

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Strings - Reading

Example

```c
#include <stdio.h>

int main()
{
    char str[6];

    fgets(str, 6, stdin);
    printf("The string is: %s\n", str);

    return 0;
}
```

- fgets() function is recommend to read string from the user

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Strings – DIY

- WAP to calculate length of the string
- WAP to copy a strings
- WAP to compare two strings
- WAP to compare two strings ignoring case
- WAP to check a given string is palindrome or not

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Strings – Library Functions

Purpose	Prototype	Return Values
Length	**size_t strlen(const char *str)**	String Length
Compare	**int strcmp(const char *str1, const char *str2)**	str1 < str2 → < 0 str1 > str2 → > 0 str1 = str2 → = 0
Copy	**char *strcpy(char *dest, const char *src)**	Pointer to dest
Check String	**char *strstr(const char *haystack, const char *needle)**	Pointer to the beginning of substring
Check Character	**char *strchr(const char *s, int c)**	Pointer to the matched char else NULL
Merge	**char *strcat(char *dest, const char *src)**	Pointer to dest

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Strings - Quiz

- Can we copy 2 strings like, str1 = str2?
- Why don't we pass the size of the string to string functions?
- What will happen if you overwrite the '\0' of string? Will you still call it a string?
- What is the difference between char *s and char s[]?

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Strings – DIY

- WAP to reverse a string
- WAP to compare string2 with string1 up to n characters
- WAP to concatenate two strings

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Strings - DIY

- Use the standard string functions like
  - strlen
  - strcpy
  - strcmp
  - strcat
  - strstr
  - strtok

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Strings – DIY

- WAP to print user information –
  - Read : Name, Age, ID, Mobile number
  - Print the information on monitor
  - Print error “Invalid Mobile Number” if length of mobile number is not 10
- WAP to read user name and password and compare with stored fields. Present a puzzle to fill in the banks
- Use strtok to separate words from string “www.emertxe.com/bangalore”