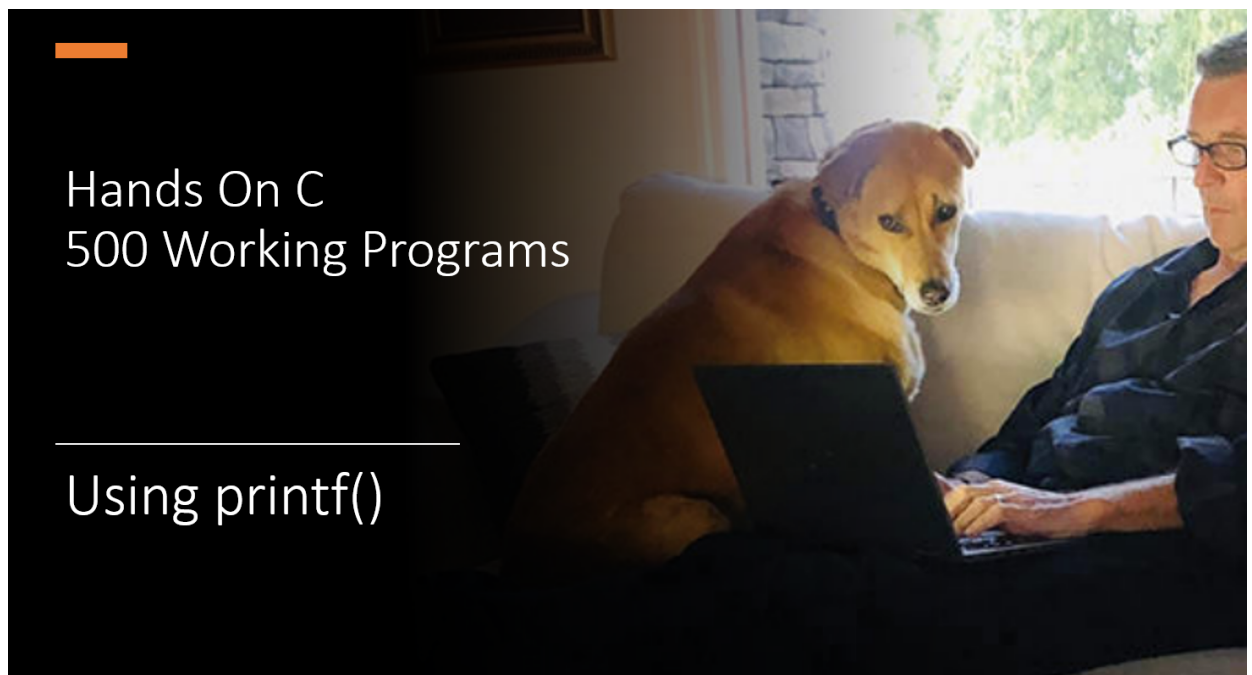
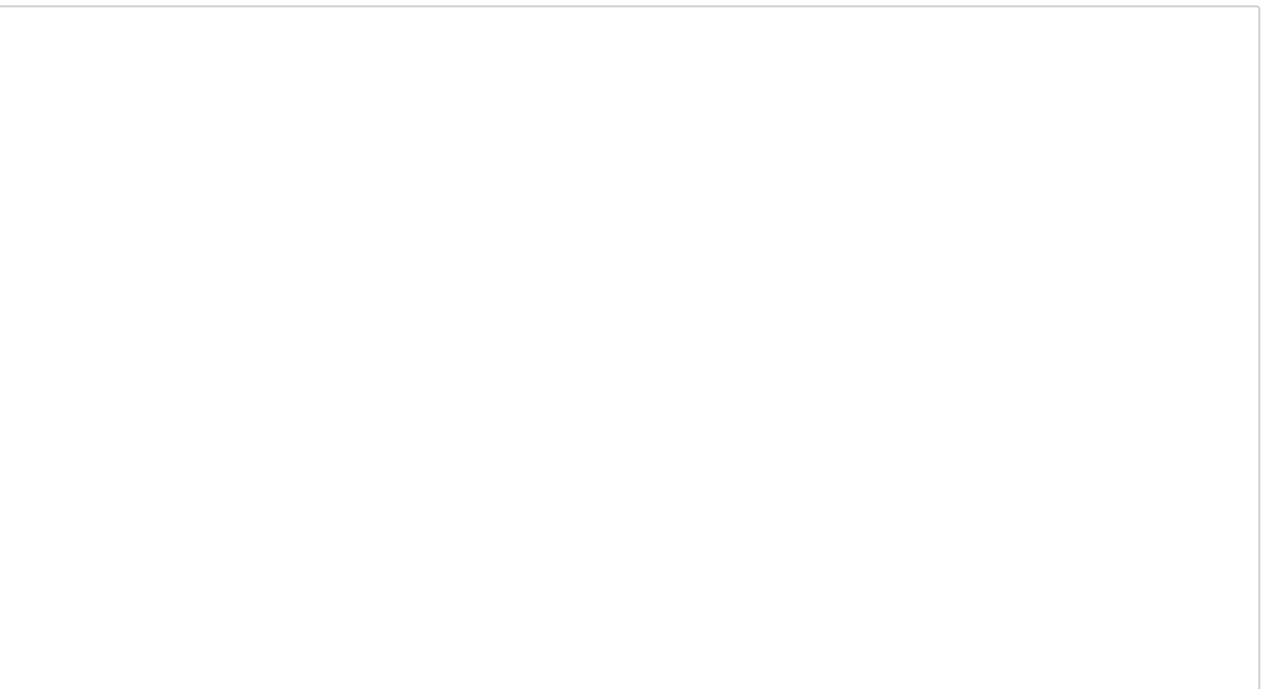




Hands On C 500 Working Programs

Using printf()



Revisiting the Hello, World Application

```
In [1]: #include <stdio.h>

int main(void)
{
    printf("Hello, world");
}
```

Hello, world

Using the newline Character \n

```
In [2]: #include <stdio.h>

int main(void)
{
    printf("Hello\nWorld");
}
```

Hello
World

Bug -- Output is on One Line

```
In [3]: #include <stdio.h>

int main(void)
{
    printf("This is line one\n");
    printf("This is line two");
}
```

This is line one
This is line two

Displaying the Output on Two Lines

```
In [4]: #include <stdio.h>

int main(void)
{
    printf("This is line one\n");
    printf("This is line two");
}
```

```
This is line one
This is line two
```

Where We are Going with printf

```
In [5]: #include <stdio.h>

int main(void)
{
    int age = 30;
    float salary = 30000.00;
    int weight = 180, height = 72;
    float bmi = 23.1;

    printf("The user\'s age is %d\n", age);
    printf("His salary is $%8.2f\n", salary);
    printf("Weight %d Height %d BMI = %f\n", weight, height, bmi);
}
```

```
The user's age is 30
His salary is $30000.00
Weight 180 Height 72 BMI = 23.100000
```

Displaying Values of Type int

```
In [6]: #include <stdio.h>

int main(void)
{
    int age = 30;
    int hours = 12, minutes = 30;
    printf("Her age is %d\n", age);
    printf("The time is %d:%d", hours, minutes);
}
```

Her age is 30
The time is 12:30

Displaying Octal and Hexadecimal Values

```
In [7]: #include <stdio.h>

int main(void)
{
    int value = 10;

    printf("The value %d in octal is %o\n", value, value);
    printf("The value %d in hexadecimal is %X", value, value);
}
```

The value 10 in octal is 12
The value 10 in hexadecimal is A

Preceding Octal and Hexadecimal Values with a Prefix

In [8]: `#include <stdio.h>`

```
int main(void)
{
    int value = 10;

    printf("The value %d in octal is %#o\n", value, value);
    printf("The value %d in hexadecimal is %#X", value, value);
}
```

The value 10 in octal is 012

The value 10 in hexadecimal is 0XA

Displaying an Unsigned Value

In [9]: `#include <stdio.h>`

```
int main(void)
{
    unsigned int ram = 65535;

    printf("Amount of RAM is %u\n", ram);
}
```

Amount of RAM is 65535

Displaying a Value of Type long

```
In [10]: #include <stdio.h>

int main(void)
{
    long int debt = 1000000L;

    printf("Amount of student debt is %ld\n", debt);
}
```

Amount of student debt is 1000000

Displaying Values of Type float

```
In [11]: #include <stdio.h>

int main(void)
{
    float income = 150000.0, tax = 0.30;

    printf("Tax on %f is %f\n", income, income * tax);
}
```

Tax on 150000.000000 is 45000.000000

Displaying Values of Type char

```
In [12]: #include <stdio.h>

int main(void)
{
    char grade = 'A';

    printf("Student grade: %c\n", grade);
}
```

Student grade: A

Displaying Floating Point Values using an Exponential Format

```
In [13]: #include <stdio.h>

int main(void)
{
    float small = 0.0000001;
    float large = 1234567890.0;

    printf("small %e large %e\n", small, large);
}
```

small 1.000000e-07 large 1.234568e+09

Letting printf Determine %f or %e

In [14]: `#include <stdio.h>`

```
int main(void)
{
    float small = 0.001;
    float large = 1234567890.0;

    printf("small %g large %g\n", small, large);
}
```

small 0.001 large 1.23457e+09

Displaying a Character String

```
In [15]: #include <stdio.h>

int main(void)
{
    char string[] = "Hello, world";
    printf("The string is %s\n", string);
    printf("%s\n", string);
}
```

```
The string is Hello, world
Hello, world
```

Displaying a Pointer Value

```
In [16]: #include <stdio.h>

int main(void)
{
    int a;
    int *address = &a; // assign the address of a

    printf("The address of a is %p\n", address);
}
```

The address of a is 0x7ffffb34e7c

Preceding a Value with a Plus (+) Sign or Negative (-) Sign

```
In [17]: #include <stdio.h>

int main(void)
{
    int positive = 50, negative = -50;

    printf("positive %d negative %d\n", positive, negative);
}
```

positive +50 negative -50

Formatting an Integer Value Using printf

```
In [18]: #include <stdio.h>

int main(void)
{
    int count = 1;

    printf("%1d%2d%3d", count, count, count);
}
```

1 1 1

Zero-Padding Integer Values

```
In [19]: #include <stdio.h>

int main(void)
{
    int value = 5;

    printf("value %01d\n", value);
    printf("value %02d\n", value);
    printf("value %03d\n", value);
}
```

```
value 5
value 05
value 005
```

Formatting a Floating-Point Value Using printf

In [20]: `#include <stdio.h>`

```
int main(void)
{
    float pi = 3.14159;
    printf("pi %5.1f\n", pi);
    printf("pi %5.2f\n", pi);
    printf("pi %5.5f\n", pi);
}
```

```
pi 3.1
pi 3.14
pi 3.14159
```

Formatting Exponential Output

```
In [21]: #include <stdio.h>

int main(void)
{
    float value = 0.123456;

    printf("%e\n", value);
    printf("%5.1e\n", value);
    printf("%5.3e\n", value);
    printf("%5.5e\n", value);
}
```

1.234560e-01

1.2e-01

1.235e-01

1.23456e-01

Left- and Right-Justifying printf's Output

In [22]: `#include <stdio.h>`

```
int main(void)
{
    int year = 2020;

    printf("Right justified Value:%5d\n", year);
    printf("Left justified Value:%-5d\n", year);
}
```

Right justified Value: 2020

Left justified Value:2020

Combining printf Format Specifiers

In [23]: `#include <stdio.h>`

```
int main(void)
{
    int item = 1;
    float cost = 19.95;
    char description[] = "Book";

    printf("Item Number %d Description %s Price $%5.2f\n", item, description, cost)
}
```

Item Number 1 Description Book Price \$19.95

Wrapping a Long Character String

```
In [24]: #include <stdio.h>

int main(void)
{
    printf("This is line one very long \
line that wraps");
}
```

This is line one very long line that wraps

Using printf's Escape Characters

Escape Character	Meaning
\a	ASCII bell character
\b	Backspace
\f	Formfeed
\n	Newline
\r	Carriage return
\t	Horizontal Tab
\v	Vertical Tab
\'	Single quote
\"	Double quote
\?	Question mark
\nnn	ASCII value in octal
\xnnn	ASCII value in hexadecimal

In [25]: `#include <stdio.h>`

```
int main(void)
{
    printf("What\'s your name?\n");
    printf("A\tB\tC\n");
    printf("Hello\rGoodbye World");
}
```

What's your name?
A B C
Goodbye World

Determining the Number of Characters printf Displayed

```
In [26]: #include <stdio.h>

int main(void)
{
    int a, b;

    printf("Hello,%n world%n", &a, &b);
    printf("\na = %d b = %d", a, b);    // Carriage return at start of string
}
```

```
Hello, world
a = 6 b = 12
```

Using printf's Return Value

In [27]: `#include <stdio.h>`

```
int main(void)
{
    int count = printf("Hello, world\n");
    printf("Characters printed %d\n", count);

    if (count == EOF)
        printf("Error in output\n");
}
```

Hello, world
Characters printed 13

What You will Learn Next

To perform meaningful operations, programs perform arithmetic operations such as addition and subtraction.

- + addition
- subtraction
- * multiplication
- / division

```
value = 1 + 3;
```

