INTRODUCTION TO PROGRAMMING IN C - PART 3

So far

* Sequential construct

* Conditional construct

Today

* Iterative construct
Iterative constructs

* While

Flow diagram:

Example:

```c
while (x <= 10)
{
    printf("x=%d\n", x);
    x = x + 1;
}
```
* For

Flow diagram:

Example:

```c
for (x = 0; x <= 10; x=x+1)
    printf("x=%d\n", x);
```
* Equivalence of while and for:

While

For

Initialization

Condition

True

Statement

Update
Example:

```c
x = 0;
while (x <= 10) {
    printf("x=%d\n", x);
    x = x + 1;
}
for (x = 0; x <= 10; x=x+1)
    printf("x=%d\n", x);
```

Note: in practice, we use the `for` loop when we know how many iterations to do, and use `while` when this is undetermined.
Increment/decrement shortcuts:

```
x++;
/* Equivalent to x=x+1; */
x--;
/* Equivalent to x=x-1; */
```

Break and continue

```
break; /* Will cause loop to terminate */
continue; /* Skip rest of code in loop and start executing next iteration */
```
Example:

```c
int i=0;
while (i<10)
{
    i++;
    if (i==5)
        continue;
    printf("%d\n",i);
}
```

```c
int i=0;
while (i<10)
{
    i++;
    if (i==5)
        break;
    printf("%d\n",i);
}
```
Examples

*Problem: echo characters from the keyboard into display until '0' (sentinel) is typed

```c
#include <stdio.h>  /* needed for printf and scanf */

int main ()
{
    char inchar;
    scanf("%c", &inchar);
    while (inchar != '0')
    {
        printf("%c\n", inchar);
        scanf("%c", &inchar);
    }
    return 0;
}
```

*Problem: add the first n positive integer numbers and print result to the display, where n is chosen by user
#include <stdio.h>    /* needed for printf and scanf */

int main()
{
    int n, i, sum=0;

    printf("Choose n: ");
    scanf("%d", &n);

    for(i=1; i<=n; i++)
    {
        sum+=i;    /* sum = sum+i; */
    }
    printf("The sum of the first %d positive integers is %d\n", n, sum);
    return 0;
}