

Day 12

- (Quiz)
- Basic `while` loop
- Common `while` loop flaws
- (Exercises)

ME123 Computer Programming

Basic `while` loop

`while` loops are similar to `for` loops, except that `while` loops only loop while some condition is true:

```
while (condition)
```

```
    do this
```

```
    and this
```

```
    and this
```

```
end
```

Conditions are similar to what we use on if statements

You can have as many commands as you wish inside the loop

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Basic while loop

Example: Starting from $n=1$, double n until it gets bigger than 25.

```
1 -   clc
2 -   clear variables
3 -   n=1;
4 -   while (n < 25)
5 -       fprintf('n is %2.0f \n',n);
6 -       n=n*2;
7 -   end
```

```
Command Window
n is 1
n is 2
n is 4
n is 8
n is 16
fx >> |
```

A while loop is better than a for loop here because we don't have to know how many times to go through the loop—just when to quit

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Basic while loop

while loops check the condition each time they hit the while, so the order of commands matters

```
1 -   clc
2 -   clear variables
3 -   n=1;
4 -   while (n < 25)
5 -       n=n*2;
6 -       fprintf('n is %2.0f \n',n);
7 -   end
```

Here we double n , then print

```
Command Window
n is 2
n is 4
n is 8
n is 16
n is 32
fx >> |
```

We get one more entry than we intended. (Also lost $n=1$ at the beginning.)

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Basic while loop

If the condition never changes, the loop never ends!

```
1-   clc
2-   clear variables
3-   n=1;
4-   while (n < 25)
5-       fprintf('n is %2.0f \n',n);
6-       n=n*2;
7-   end
```

```
Command Window
n is 1
n is 2
n is 4
n is 8
n is 16
fx >> |
```

This means you **MUST** modify the condition variables inside the loop

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Common while loop flaws

Flaw: forgetting to change the condition inside the loop

```
1-   clc
2-   clear variables
3-   n=1;
4-   while (n < 25)
5-       fprintf('n is %2.0f \n',n);
6-   end
```

n never changes

```
Command Window
n is 1
n is 1
n is 1
n is 1
n is 1
n is 1
n is 1
n is 1
n is 1
n is 1
```

loop runs forever

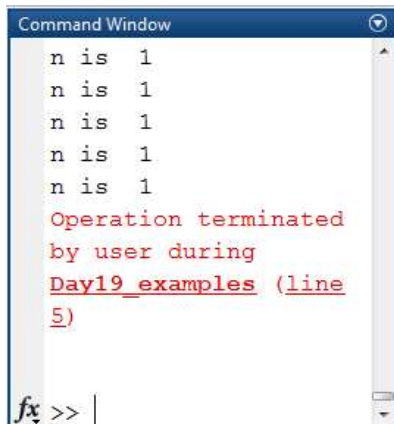
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Common while loop flaws

Recall: to kill a run

click in command window, then

press **Ctrl** and **c** keys at the same time.



```
Command Window
n is 1
n is 1
n is 1
n is 1
n is 1
Operation terminated
by user during
Day19_examples (line
5)
fx >>
```

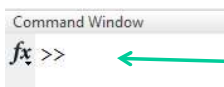
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Common while loop flaws

Flaw: setting the condition incorrectly so the loop never runs

```
1 -   clc
2 -   clear variables
3 -   n=1;
4 -   while (n > 25)
5 -       fprintf('n is %2.0f \n',n);
6 -       n=n*2;
7 -   end
```

n isn't bigger than 25 when we begin— Matlab skips the loop



```
Command Window
fx >>
```

program runs but nothing prints because loop executes zero times

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