Parking Garage:

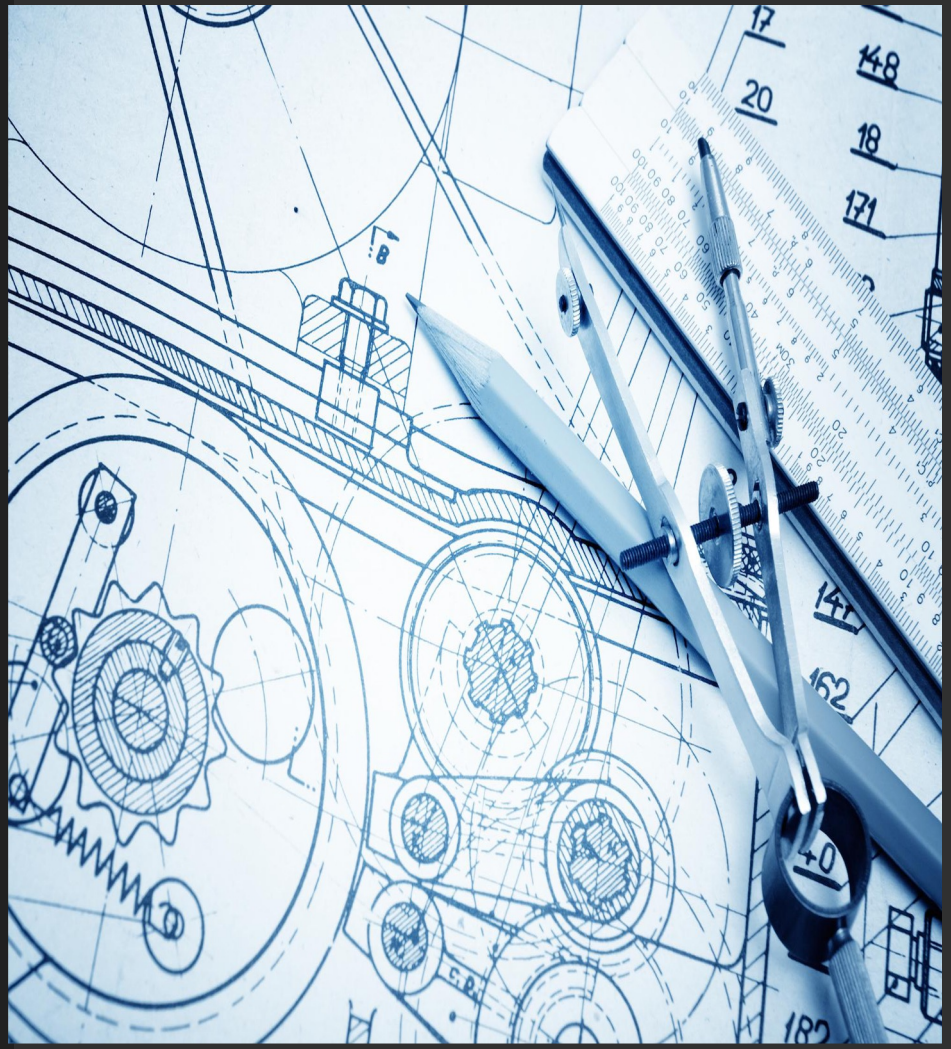
A New Look

Introduction

For my Engineering Fundamentals II Project I decided to make a parking garage system that would auto update and display open spots for cars to park in on certain levels. The parking garage consists of three levels for the driver to pick from upon entering the establishment. The project was a blast to do and would be a great addition to many parking garages I park at.

Passion:

As engineering we are always striving to elevate the standard of living and make systems more efficient. To my surprise this isn’t a common feature in many parking garages, so I set out to build a simplified version of it. This will improve the efficiency of parking garages extensively.



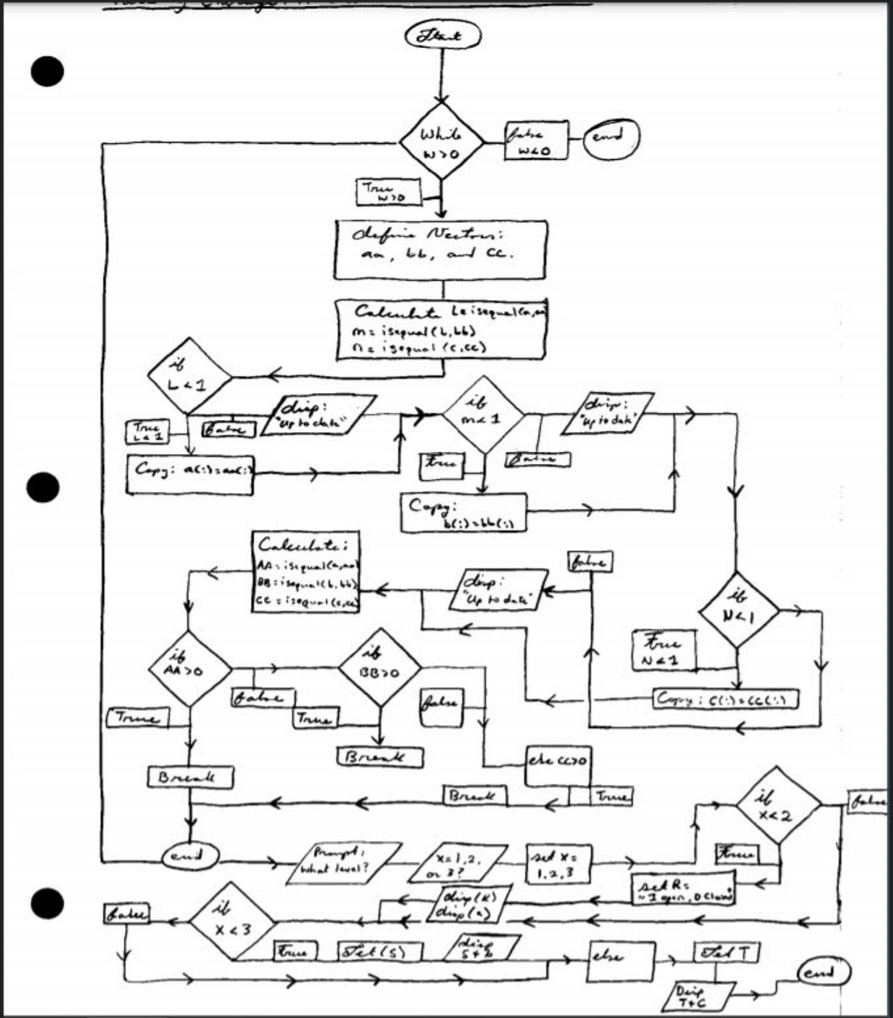
President Hoover:

“It is a great profession. There is the fascination of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realization in stone or metal or energy. Then it brings jobs and homes to men. Then it elevates the standards of living and adds to the comforts of life. That is the engineer’s high privilege.

Challenges

The challenges faced were only the ones of pure logic. Finding the way to accomplish my goal in the most efficient way through the code, was the hardest part. I've learned so many functions in MatLab this semester and this was really just piecing them all together to collectively serve a useful purpose. I loved the challenge.

Flow Chart:


Start
While W>0
false W<0
end
True W>0
define Vectors: aa, bb, and cc.
Calculate L=isequal(a,aa) m=isequal(b,bb) n=isequal(c,cc)
if L<1
True L<1
false
disp: "Up to date"
Copy: a(:)=aa(:)
if m<1
True
false
disp: "Up to date"
Copy: b(:)=bb(:)
Calculate: AA=isequal(a,aa) BB=isequal(b,bb) CC=isequal(c,cc)
disp: "Up to date"
false
if N<1
True N<1
Copy: c(:)=cc(:)
if AA>0
false
True
if BB>0
True
false
Break
Break
else CC>0
Break
True
if X<2
false
True
end
Prompt: what level?
X=1,2, or 3?
set X= 1,2,3
set R= 1 open, 0 close
disp(K) disp(a)
if X<3
false
True
Set(S)
disp S+3
else
Set T
end
Disp T+C

Engineering Fundamentals II- Parking Garage Project

Edwin Sparks 001040826 Engineering Fundamental II April 12, 2021

```
% This is my MatLab Code for the automated parking garage program that will display which
% parking spots are avaliable in a parking garage.
```

Matrix Open Spots

```
a=[1,0,0,0,0,0,0,0;
   0,1,0,0,0,0,0,0;
   0,0,1,0,0,0,0,0;
   0,0,0,1,0,0,0,0;
   0,0,0,0,1,0,0,0];
b=[0,0,0,0,0,0,0,1;
   0,0,0,0,0,0,1,0;
   0,0,0,0,0,1,0,0;
   0,0,0,0,1,0,0,0;
   0,0,0,1,0,0,0,0];
c=[0,0,0,0,0,0,0,0;
   0,0,0,0,0,0,0,0;
   1,1,1,1,1,1,1,1;
   0,0,0,0,0,0,0,0;
   0,0,0,0,0,0,0,0];

% Updated parking spots from previous night %
```

Matrix detecting open spots and Updating

```
W=1;
while W>0
aa=[1,0,1,0,1,0,1,0;
    0,1,0,0,0,0,1,0;
    0,0,1,0,0,0,0,0;
    0,0,0,1,0,0,1,0;
    0,0,0,0,1,0,0,0];
bb=[0,1,0,1,0,1,0,1;
    0,0,0,1,0,0,1,0;
    0,0,1,0,0,1,0,0;
    0,0,0,0,1,0,0,0;
    1,1,0,1,0,0,0,0];
cc=[1,0,0,0,0,0,0,0;
    0,1,0,0,0,0,0,0;
    1,1,1,1,1,1,1,1;
    0,0,0,0,0,0,0,0;
    0,1,0,1,0,1,0,1];

L=isequal(a,aa);
M=isequal(b,bb);
N=isequal(c,cc);

if L<1
     a(:)=aa(:);
```



```
else
     disp("Level is up to date")
end

if M<1
     b(:)=bb(:);
else
     disp("Level is up to date")
end

if N<1
     c(:)=cc(:);
else
     disp("Level is up to date")
end
```

```
AA=isequal(a,aa);
BB=isequal(b,bb);
CC=isequal(c,cc);
    if AA>0
        break
    elseif BB>0
        break
    else CC>0
        break
    end
end
```

Matrix open spots (revised)

```
prompt= "What parking garage level would you like to park on (1,2,3)?";
x=input(prompt);

if x<2
    R="1 is an open spot, 0 is a closed spot";
    disp(R)
    disp(a)
elseif x<3
    S="1 is an open spot, 0 is a closed spot";
    disp(S)
    disp(b)
else
    T="1 is an open spot, 0 is a closed spot";
    disp(T)
    disp(c)
end

stem(a(:))
```



```
% The matrix has sucessfully updated and auto updates %
```

Engineering Fundame

Edwin Sparks 001040826 Engineeri

```
% This is my MatLab Code for
% parking spots are avaliabl
```

Matrix Open Spots

```
a=[1,0,0,0,0,0,0,0;
   0,1,0,0,0,0,0,0;
   0,0,1,0,0,0,0,0;
   0,0,0,1,0,0,0,0;
   0,0,0,0,1,0,0,0];
b=[0,0,0,0,0,0,0,1;
   0,0,0,0,0,0,1,0;
   0,0,0,0,0,1,0,0;
   0,0,0,0,1,0,0,0;
   0,0,0,1,0,0,0,0];
c=[0,0,0,0,0,0,0,0;
   0,0,0,0,0,0,0,0;
   1,1,1,1,1,1,1,1;
   0,0,0,0,0,0,0,0;
   0,0,0,0,0,0,0,0];
```

```
% Updated parking spots from previous night %
```

Editor - C:\Users\Sonny Sparks\OneDrive\Documents\Engineering Fun II Project\Edwin_Sparks_Parking_Garage_Project1.m

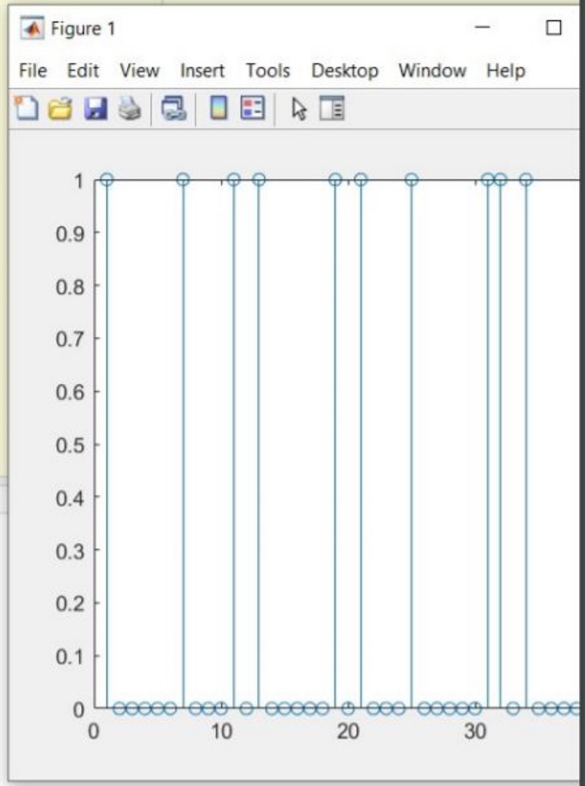
nfnitseriestst.m | Edwin_Sparks_Parking_Garage_Project1.m

```
88 -    x=input(prompt);
89
90 -    if x<2
91 -        R="1 is an open spot, 0 is a closed spot";
92 -        disp(R)
93 -        disp(a)
94 -    elseif x<3
95 -        S="1 is an open spot, 0 is a closed spot";
96 -        disp(S)
97 -        disp(b)
98 -    else
99 -        T="1 is an open spot, 0 is a closed spot";
100 -       disp(T)
101 -       disp(c)
102 -   end
103
104 -   stem(a(:))
```

Command Window

```
>> Edwin_Sparks_Parking_Garage_Project1
What parking garage level would you like to park on (1,2,3)?1
1 is an open spot, 0 is a closed spot
     1     0     1     0     1     0     1     0
     0     1     0     0     0     0     1     0
     0     0     1     0     0     0     0     0
     0     0     0     1     0     0     1     0
     0     0     0     0     1     0     0     0

fx >>
```



Conclusion:

The world is a better place, parking garages are as efficient as the chick-fil-a drive thru. Through the use of Matlab functions, if and while, users can see all available parking spots in the garage and go straight to the nearest one. Hopefully this becomes a standard among Parking garages all over America and we never have to aimlessly drive up and in circles ever again.