

# Simple Logic Elevator

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# Overview

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- ✦ Specifications
- ✦ Features
- ✦ Design Process
- ✦ Computer Code
- ✦ Circuit Diagram
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- ✦ Cost Estimate
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# Proposal

- ✦ A three-floored elevator
- ✦ One door with safety sensor
- ✦ Indicator
- ✦ Suitable for parking garage, subway station, etc.

# Specifications

- ✦ Prototype is controlled by BS2
- ✦ Safety circuitry
- ✦ Instantaneous automatic and manual control
- ✦ Included actuators and sensors
- ✦ Feedback system

# Features

- Smoke detector

- Safety sensory system



# Design Process

## ✦ Mechanical construction

1. Track
2. Elevator box
3. Sliding door





# Design process

## ✦ Programming & Electrical circuit

1. Elevation
2. Door movement
3. Status indication
4. BS2 protection
5. User interface hardware

# Computer Code

```
'{$STAMP BS2}  
debug "start program", cr  
position var nib  
rct var word  
x var word  
n var word  
a var bit  
log var bit(6)  
ptr var nib  
ptr=0  
position=1  
for x=0 to 5  
    'initialize array to all 0s  
log(n)=0  
next
```





high 7

```
mainloop:  
gosub check0  
      'constantly checking user  
inputs
```

```
start:  
for n=ptr to 5  
      'set  
pointer to the first destination  
if log(n)=1 then setptr  
next
```

```
for n=0 to ptr  
      'set  
pointer to the first destination  
if log(n)=1 then setptr  
next  
if in8=0 then alarm
```



```
loop:
debug "floor = ",dec position,tab,
"pointer ", dec ptr, cr
if (position=1) and (ptr=2 or ptr=3)
then goup1f
if (position=1) and (ptr=4 or ptr=5)
then goup2f
if (position=2) and (ptr=0 or ptr=1)
then godown1f
if (position=2) and (ptr=4 or ptr=5)
then goup1f
if (position=3) and (ptr=0 or ptr=1)
then godown2f
if (position=3) and (ptr=2 or ptr=3)
then godown1f
if a=1 then stopelevator
if (position=1) and (ptr=0 or ptr=1)
then donothing
if (position=2) and (ptr=2 or ptr=3)
then donothing
if (position=3) and (ptr=4 or ptr=5)
then donothing
goto mainloop
```



```
goup1f:  
gosub close_door  
for x=1 to (8*42)  
pulsout 11, 300  
pause 10  
gosub check0  
next  
gosub open_door  
position=position+1  
goto start
```

```
goup2f:  
gosub close_door  
for x=1 to (16*42)  
pulsout 11,300  
pause 10  
gosub check0  
next  
gosub open_door  
position=position+2  
goto start
```



```
godown1f:  
gosub close_door  
for x=1 to (8*36)  
pulsout 11, 1700  
pause 10  
gosub check0  
next  
gosub open_door  
position=position-1  
goto start
```

```
godown2f:  
gosub close_door  
for x=1 to (16*37)  
pulsout 11, 1700  
pause 10  
gosub check0  
next  
gosub open_door  
position=position-2  
goto start
```



check0:

if (in0=1 and log(0)=0) then  
location0

check1:

if (in1=1 and log(1)=0) then  
location1

check2:

if (in2=1 and log(2)=0) then  
location2

check3:

if (in3=1 and log(3)=0) then  
location3

check4:

if (in4=1 and log(4)=0) then  
location4

check5:

if (in5=1 and log(5)=0) then  
location5

return

location0:

log(0)=1

if ptr >= 4 then setptrto0

goto check1





location1:  
log(1)=1  
if ptr >= 4 then setptrto0  
goto check2

location2:  
log(2)=1  
if ptr >= 4 then setptrto0  
goto check3

location3:  
log(3)=1  
if ptr >= 4 then setptrto0  
goto check4

location4:  
log(4)=1  
if ptr >= 4 then setptrto0  
goto check5





```
location5:  
log(5)=1  
if ptr>=4 then setptrto0  
return
```

```
setptrto0:  
ptr=0  
goto mainloop
```

```
setptr:  
ptr=n  
goto loop
```


```
alarm:  
a = 1  
freqout 9,200,2900  
ptr = 1  
debug "alarm", cr  
goto loop
```

```
stopelevator:  
stop
```



```
open_door:  
out7=1  
for x=1 to 100  
pulsout 10, 1200  
pause 10  
next  
log(ptr)=0  
for x=1 to 500  
gosub check0  
next  
return
```

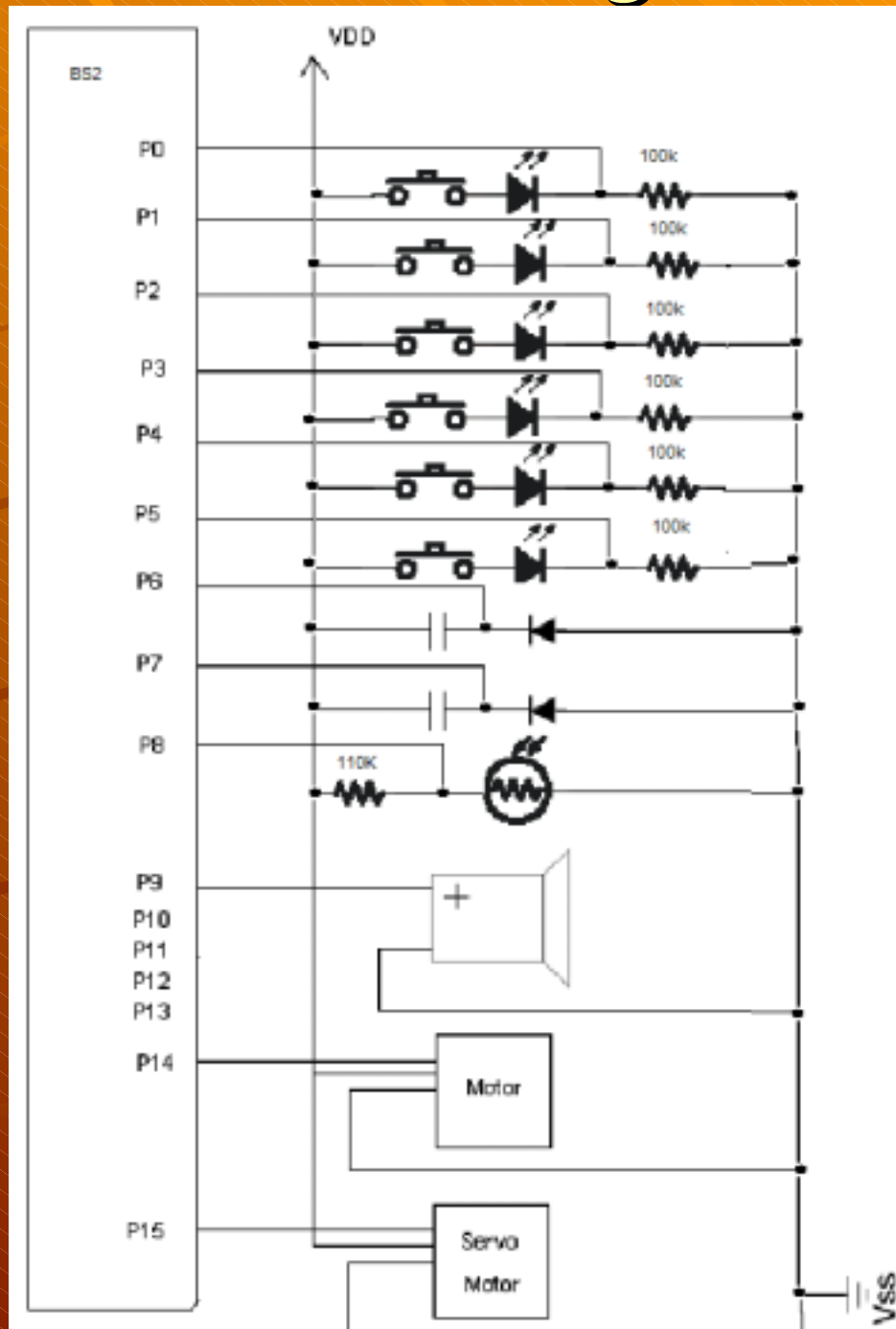


A silhouette of a person in a starting crouch on a track, positioned on the left side of the slide. The person is leaning forward with their hands on the ground and feet in starting blocks. The background is a gradient of orange and yellow with a grid pattern and curved lines.

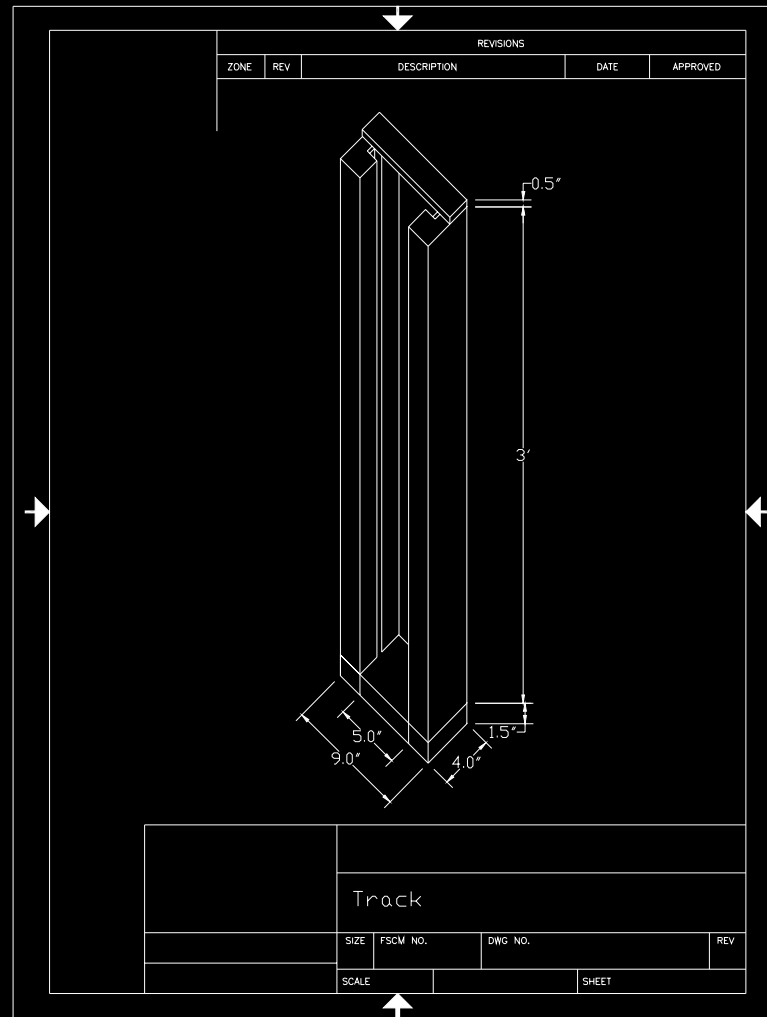
```
open:
for x=1 to 100
pulsout 10, 1200
pause 10
next
close_door:
for n=1 to 100
pulsout 10, 400
pause 10
high 6
RCTime 6,1,rct
if (rct>5000) or (rct=0) then open
next
debug "here"
out7=0
return

donothing:
log(ptr)=0
goto mainloop
```

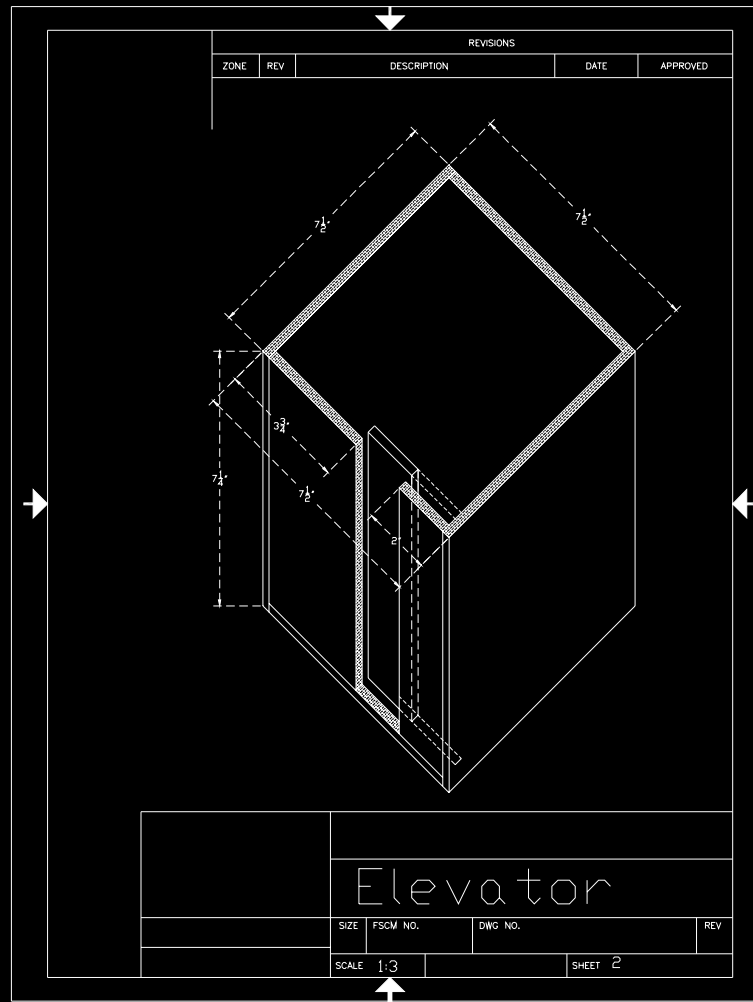
# Circuit Diagram



# Elevator Track



# Elevator

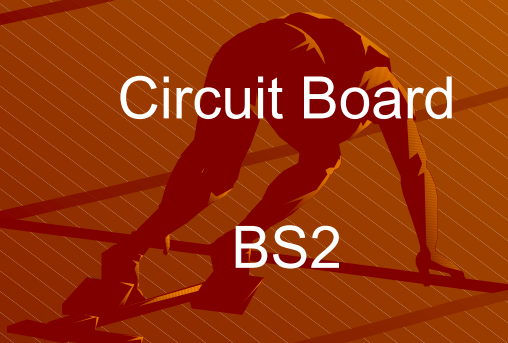




# Cost Estimate

Components	Price	Quantities	subtotal, dollars
Button	1.4	6	8.4
LED	1	8	8
Servo-Motor	12	2	24
Continuous Motor	13	1	13
Photodiode	1.5	1	1.5
Resistors	0.2	8	1.6
Construction Materials	35	boards	35

# Cost Estimate



Components	Price	Quantities	subtotal, dollars
Capacitors	0.25	1	0.25
Piezo-Speaker	5	1	5
Circuit Board	9	1	9
BS2	100	1	100
<b>Total Cost</b>			<b>205.75</b>

# Conclusion

- ✦ Easy operation
- ✦ Clear indication
- ✦ Effective safety design
- ✦ Low cost with multipurpose features

