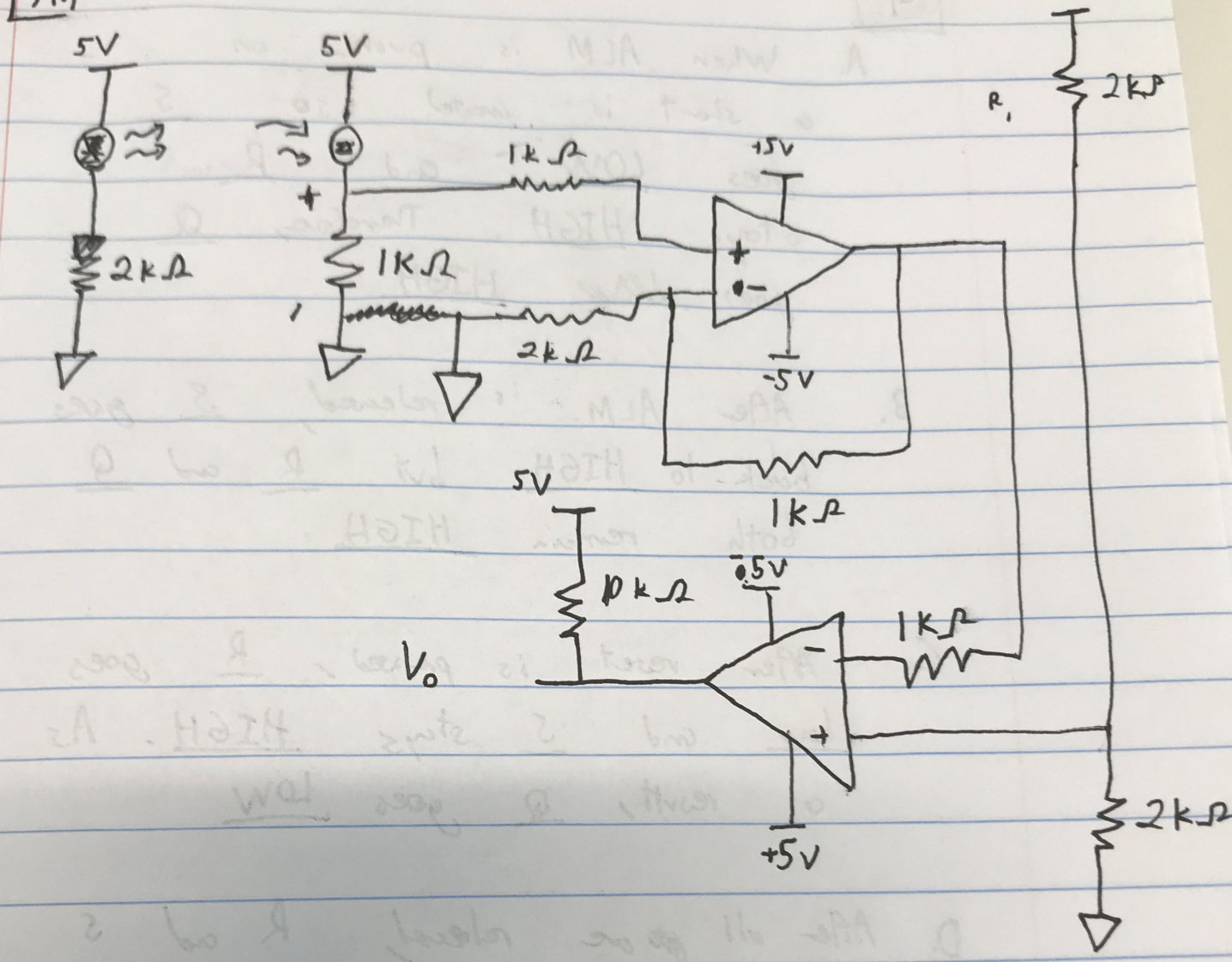
Drew Bellaven

Prelab 5

A.



B. Detector was simulated using a current source. From lab 1, 400 μA is what the detector measures with full contact and 100 μA is the obstructed current. Below are the results from SPICE

0	5V
100 μA	5V

C.

A. When ALM is pushed on a start is created so S goes LOW and R stays HIGH. Therefore, Q goes ~~low~~ HIGH

B. After ALM is released, S goes back to HIGH but R and Q both remain HIGH.

C. After reset is pressed, R goes Low and S stays HIGH. As a result, Q goes LOW

D. After all ~~go~~ are released, R and S return HIGH and Q stays LOW

D. When $V_B = 0$, The Green LED is on
When $V_B = 5$, The Red LED is On

To limit current to 10mA Let

$R_g = \frac{5}{.01} = 500\ \Omega$

$R_R = 500\ \Omega$

LTspice XVII - [Prelab4-2.asc]

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Prelab4-2.asc

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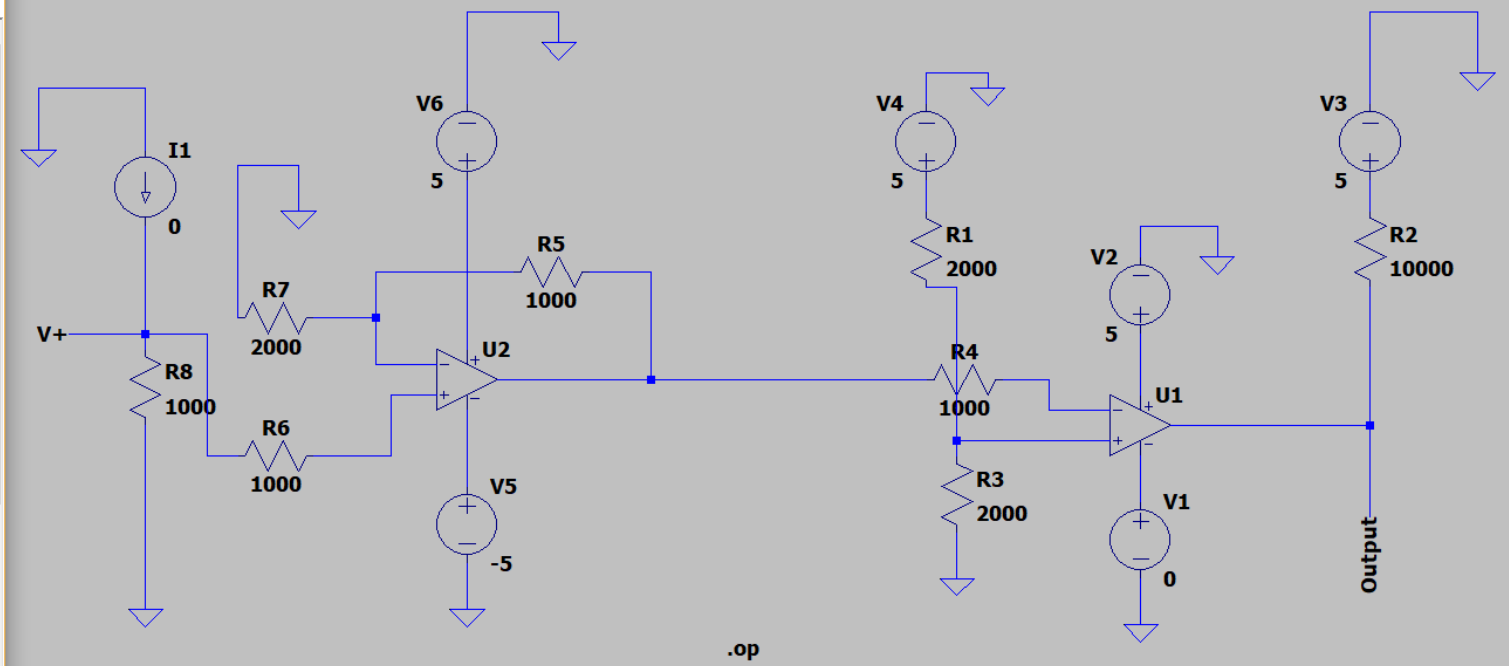
--- Operating Point ---

V(output):	4.99999	voltage
V(n009):	5	voltage
V(n011):	0	voltage
V(n007):	4.99999e-006	voltage
V(n005):	2.5	voltage
V(n002):	5	voltage
V(n001):	5	voltage
V(n004):	1.70647e-013	voltage
V(n006):	5	voltage
V(n010):	-5	voltage
V(n003):	1.13765e-013	voltage
V(n008):	0	voltage
V(v+):	0	voltage
I(I1):	0	device_current
I(R8):	0	device_current
I(R5):	5.68825e-017	device_current
I(R7):	5.68823e-017	device_current
I(R6):	0	device_current
I(R4):	4.99999e-009	device_current
I(R3):	0.00125	device_current
I(R2):	5.95507e-010	device_current
I(R1):	0.00125	device_current
I(V6):	-0.000499966	device_current
I(V5):	0.000499971	device_current
I(V4):	-0.00125	device_current
I(V3):	-5.95507e-010	device_current
I(V2):	-5.27874e-007	device_current



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Prelab4-2.asc

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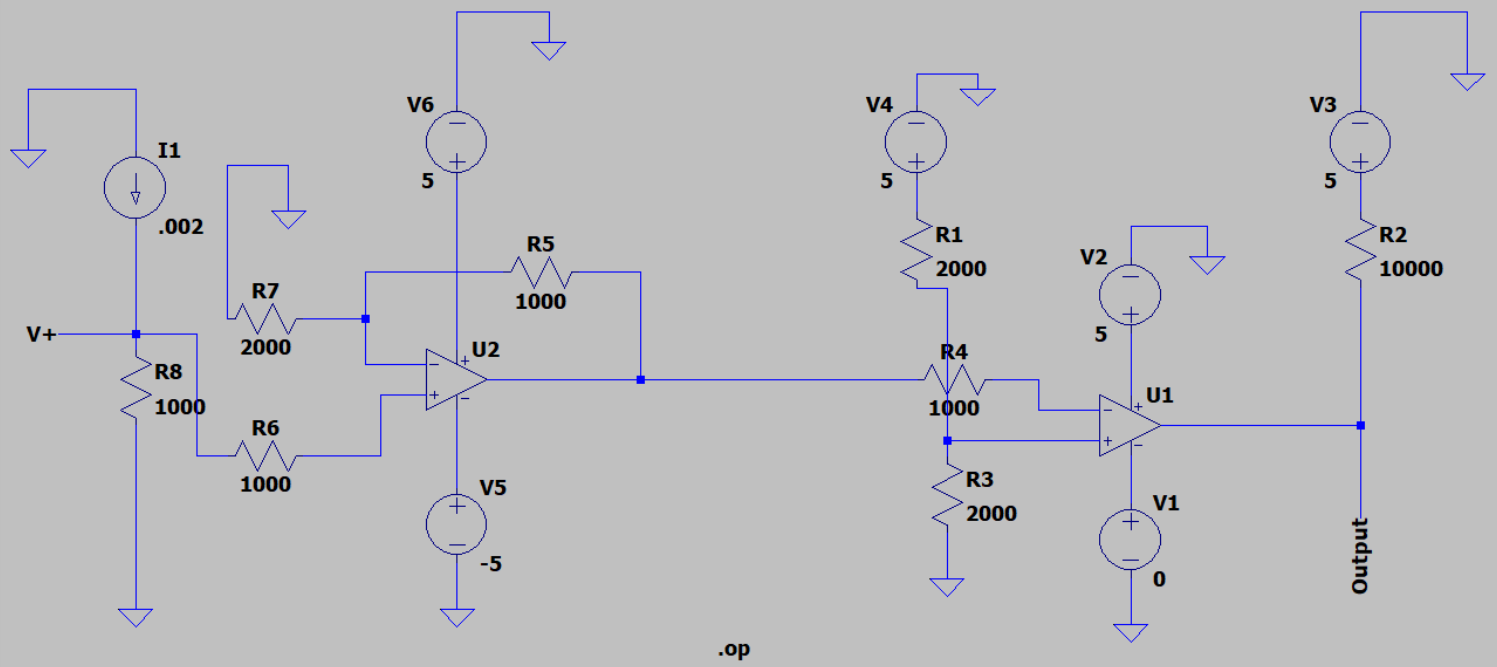
```
      --- Operating Point ---

V(output):      0.00546163     voltage
V(n009):        5              voltage
V(n011):        0              voltage
V(n007):        2.99999        voltage
V(n005):        2.5            voltage
V(n002):        5              voltage
V(n001):        5              voltage
V(n004):        2.99999        voltage
V(n006):        5              voltage
V(n010):        -5             voltage
V(n003):        1.99999        voltage
V(n008):        1.99999        voltage
V(v+):          2              voltage
I(I1):          0.002          device_
I(R8):          0.002          device_
I(R5):          0.000999999    device_
I(R7):          0.000999994    device_
I(R6):          -3.99998e-009  device_
I(R4):          -9.99973e-010  device_
I(R3):          0.00125        device_
I(R2):          0.000499454    device_
I(R1):          0.00125        device_
I(V6):          -0.00114024    device_
I(V5):          0.000140279    device_
I(V4):          -0.00125       device_
I(V3):          -0.000499454   device_
```



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Prelab4-2.asc

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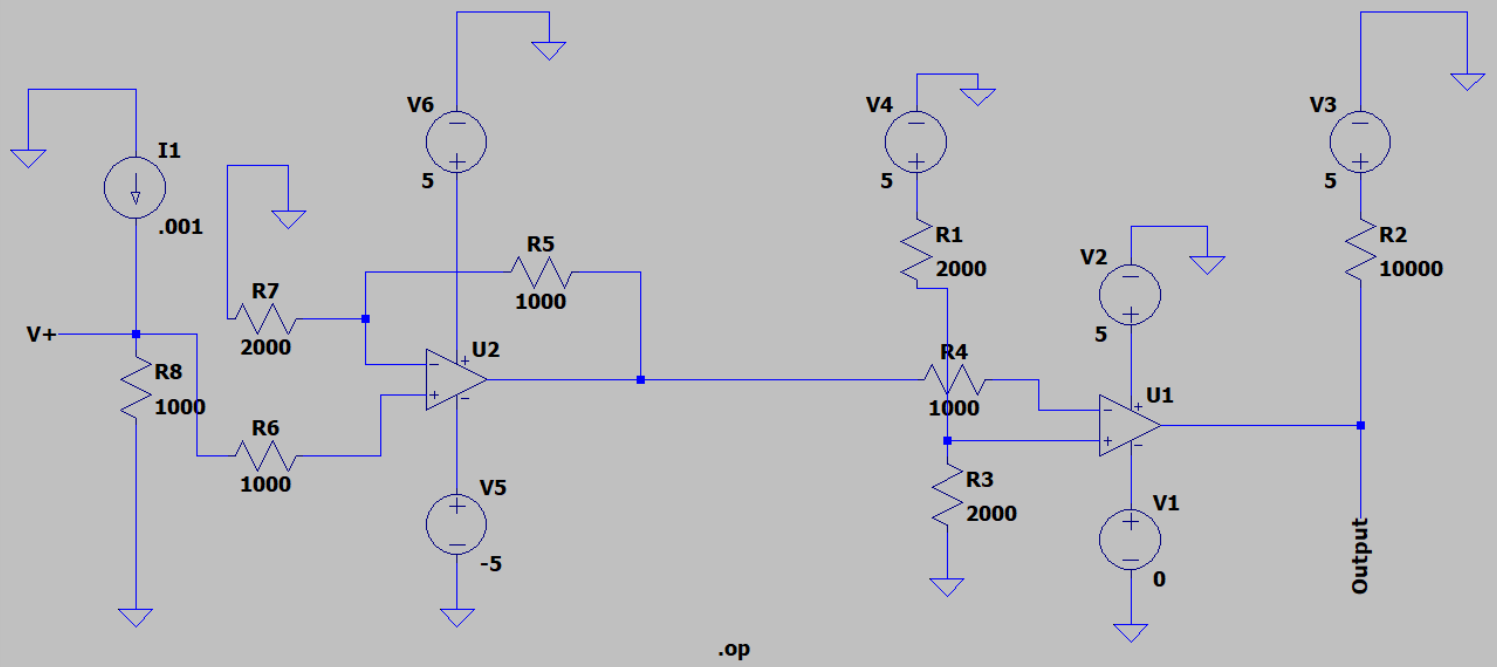
```
--- Operating Point ---

V(output):      4.99999         voltage
V(n009):        5               voltage
V(n011):        0               voltage
V(n007):        1.5             voltage
V(n005):        2.5             voltage
V(n002):        5               voltage
V(n001):        5               voltage
V(n004):        1.49999         voltage
V(n006):        5               voltage
V(n010):        -5              voltage
V(n003):        0.999994        voltage
V(n008):        0.999996        voltage
V(v+):          0.999998        voltage
I(I1):          0.001           device_
I(R8):          0.000999998     device_
I(R5):          0.000499999     device_
I(R7):          0.000499997     device_
I(R6):          -1.99999e-009   device_
I(R4):          2.00001e-009    device_
I(R3):          0.00125         device_
I(R2):          5.95508e-010    device_
I(R1):          0.00125         device_
I(V6):          -0.000788461    device_
I(V5):          0.000288483     device_
I(V4):          -0.00125        device_
I(V3):          -5.95508e-010   device_
```



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Prelab4-2.asc

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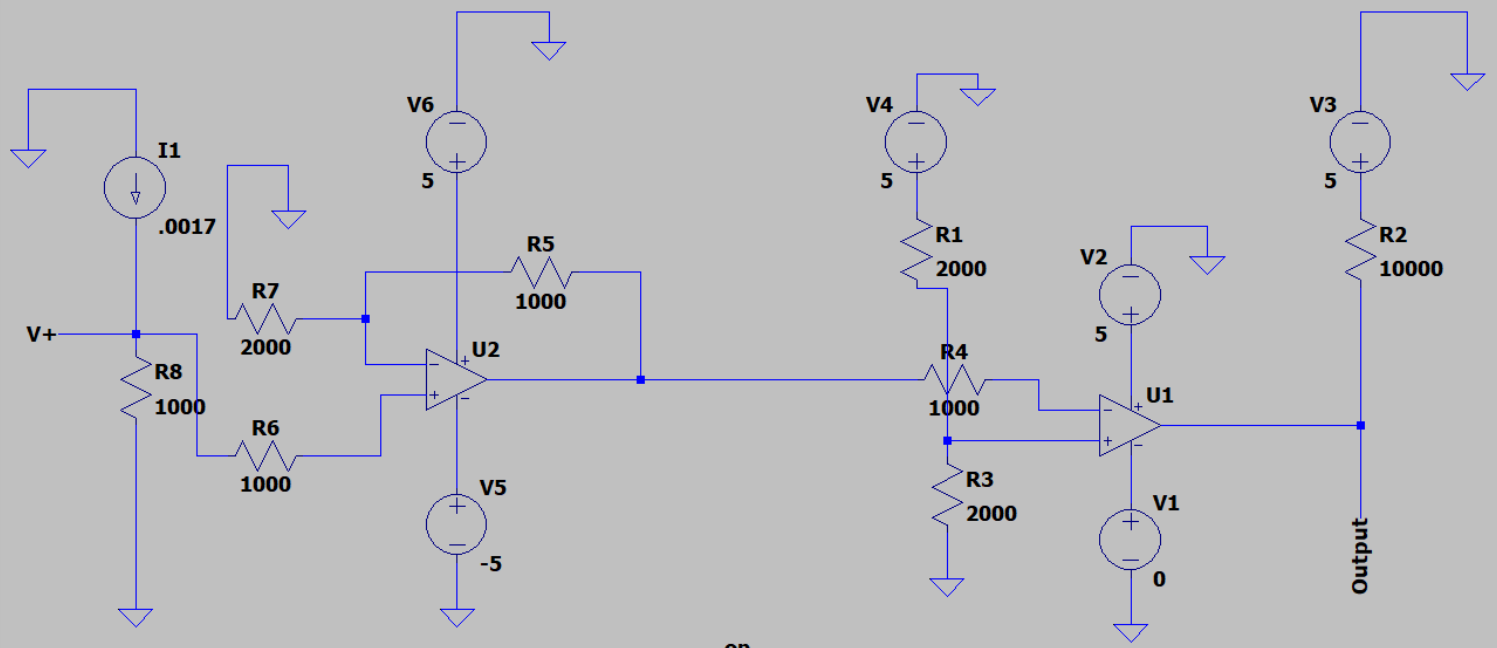
```
--- Operating Point ---

V(output):      0.00666647     voltage
V(n009):        5              voltage
V(n011):        0              voltage
V(n007):        2.54999        voltage
V(n005):        2.5            voltage
V(n002):        5              voltage
V(n001):        5              voltage
V(n004):        2.54999        voltage
V(n006):        5              voltage
V(n010):        -5             voltage
V(n003):        1.69999        voltage
V(n008):        1.69999        voltage
V(v+):          1.7            voltage
I(I1):          0.0017         device_
I(R8):          0.0017         device_
I(R5):          0.000849999    device_
I(R7):          0.000849995    device_
I(R6):          -3.39999e-009  device_
I(R4):          -9.99784e-011  device_
I(R3):          0.00125        device_
I(R2):          0.000499333    device_
I(R1):          0.00125        device_
I(V6):          -0.00102958    device_
I(V5):          0.000179611    device_
I(V4):          -0.00125       device_
I(V3):          -0.000499333   device_
```



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