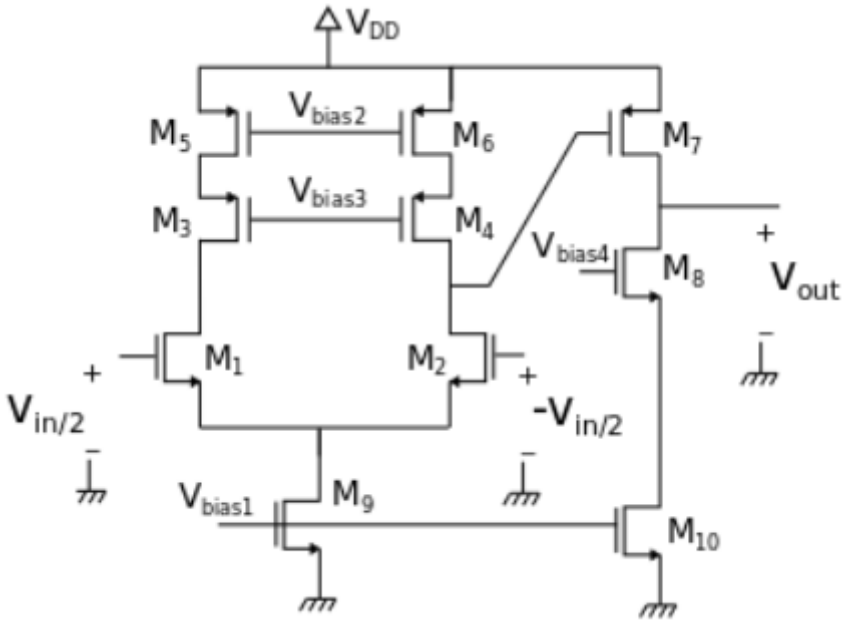
Evaluation Test III

1. Given the following opamp, what is the gain Vout/Vin? Assume that all the transistors are working in saturation, with (W/L)1 = (W/L)2, (W/L)3 = (W/L)4, y (W/L)5 = (W/L)6.

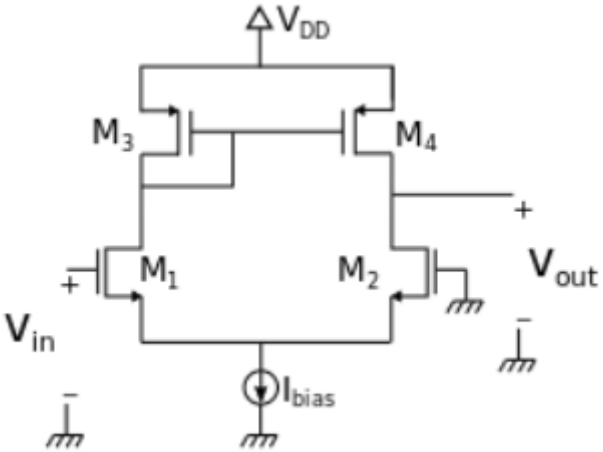


a) -0.5*gm2*((gm4*rds4*rds6)||(rds2))*gm7*((rds7)||(gm8*rds8*rds10))
b) 0.5*gm2*((rds4+rds6)||(rds2))*gm7*((rds7)||(rds8+rds10))
c) 0.5*gm2*((gm4*rds4*rds6)||(rds2))*gm7*((rds7)||(gm8*rds8*rds10))
d) -0.5*gm2*((rds4+rds6)||(rds2))*gm7*((rds7)||(rds8+rds10))

2. To design a flash converter a Miller opamp will be reused to make it work as a comparator. Which tasks should be done firstly?

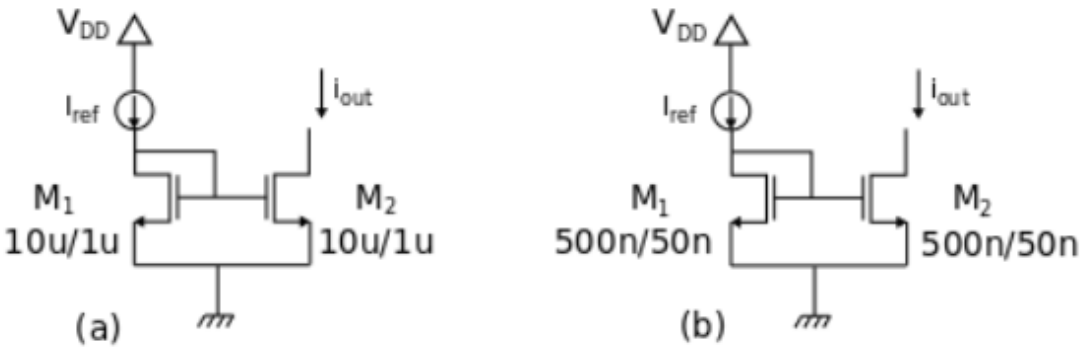
a) Redesign the values of the capacitor and the resistors used for compensation.
b) Remove compensation because comparators do not need to be compensated.
c) A Miller opamp cannot be used as a comparator.
d) Add an output stage with a common-drain configuration to achieve a high output resistance.

3. The following comparator has been designed, where v_{in} is the input signal, and v_{out} is the output signal. Gain and delay time requirements are accomplished. If the maximum achievable output voltage must be increased, what could be done? Neglect potential penalizations over other requirements.



a) Either reduce $(W/L)_4$ or I_{bias}.
b) Either reduce $(W/L)_4$ or increase I_{bias}.
c) Either increase $(W/L)_4$ or reduce I_{bias}.
d) Either increase $(W/L)_4$ or I_{bias}.
e) Any of the answers above is correct.

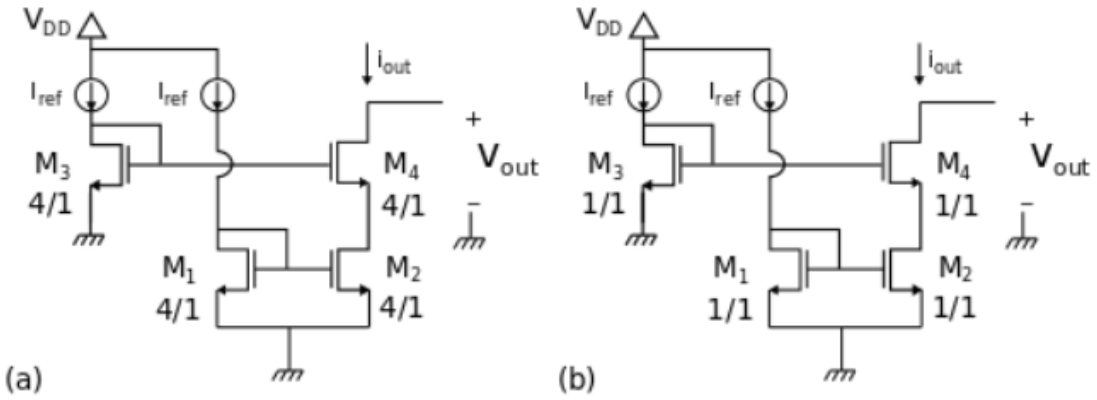
4. Given the following circuits:



Which one has a higher output resistance?

a) (a).
b) (b).
c) Both have the same output resistance.
d) With the provided data it is not possible to know it.

5. Given the following circuits:



Which one has a lower value for V_{out} to ensure that all the transistors are working in saturation?

a) Vout,min,(a) equals Vout,min,(b).
b) Vout,min,(b) is lower than Vout,min,(a) because Vout,min,(a)=16Vout,min,(b).
c) Vout,min,(a) is lower than Vout,min,(b) because Vout,min,(b)=16Vout,min,(a).
d) Vout,min,(b) is lower than Vout,min,(a) because Vout,min,(a)=2Vout,min,(b).
e) Vout,min,(a) is lower than Vout,min,(b) because Vout,min,(b)=2Vout,min,(a).