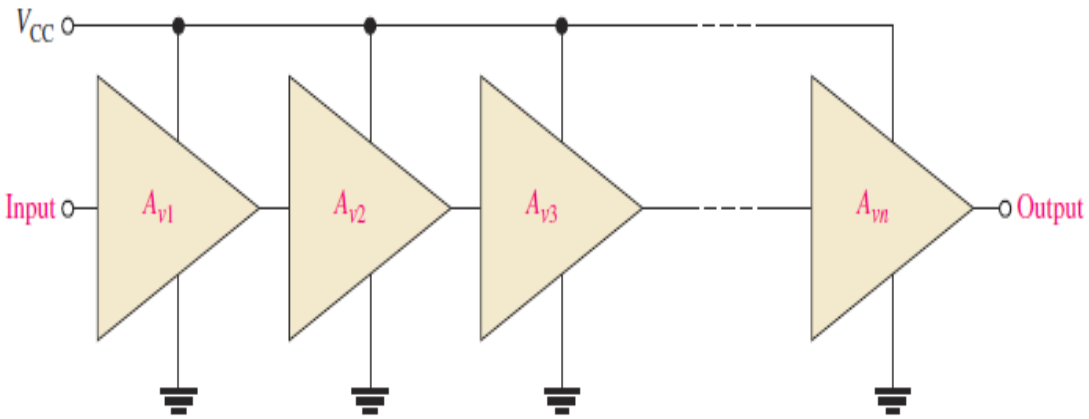
Lecture 30: Multistage Amplifiers

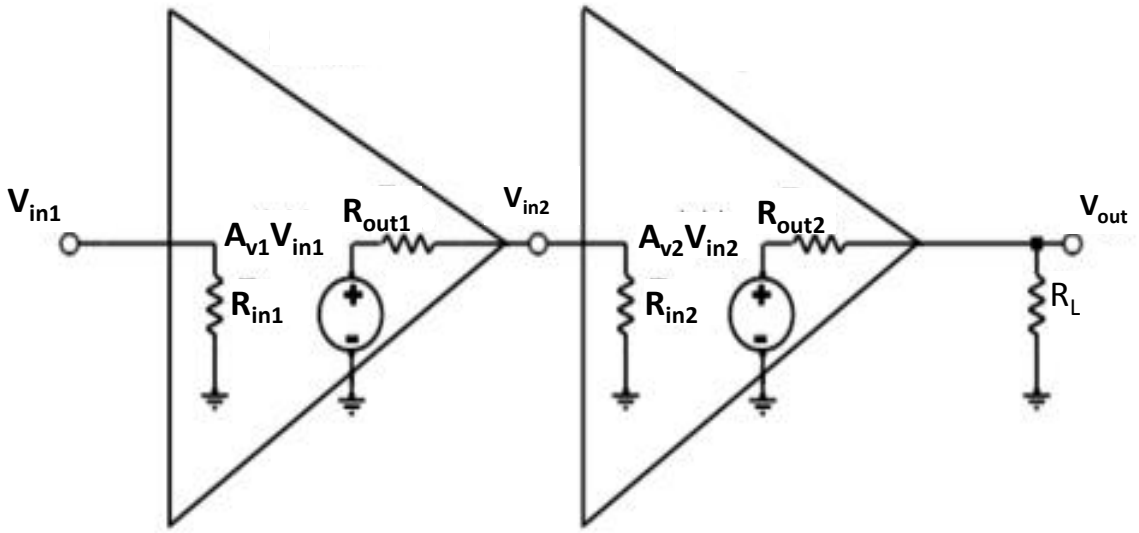
Cascaded Stages, Loading effects, Example

Cascaded Stages



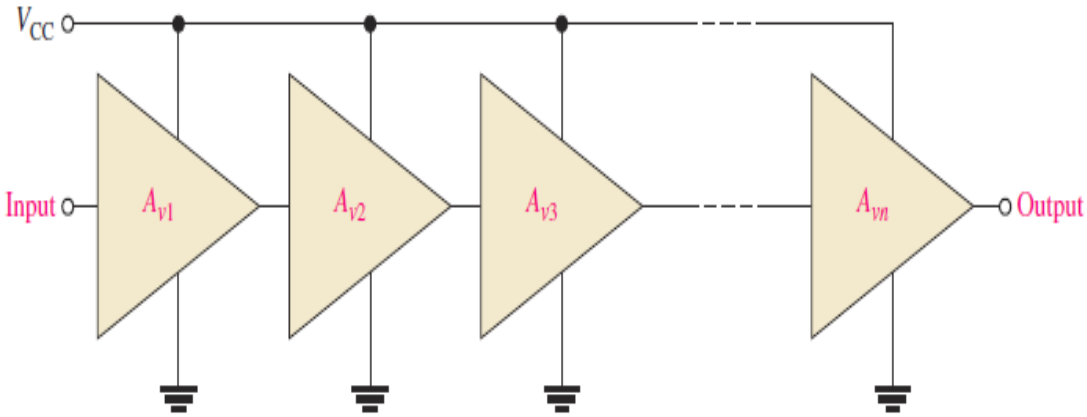
assuming that there is no loading (how?) from one stage to another, the total voltage gain is $A=A_{v1}A_{v2}..A_{vm}$ with the gain of every stage calculated independently from other stages

Cascaded Stages (Cont'd)



for most modern amplifiers, the input resistance is in the Mega Ohms while the output resistance is between 50 Ohms-100 Ohms. Near ideal conditions hold in this case

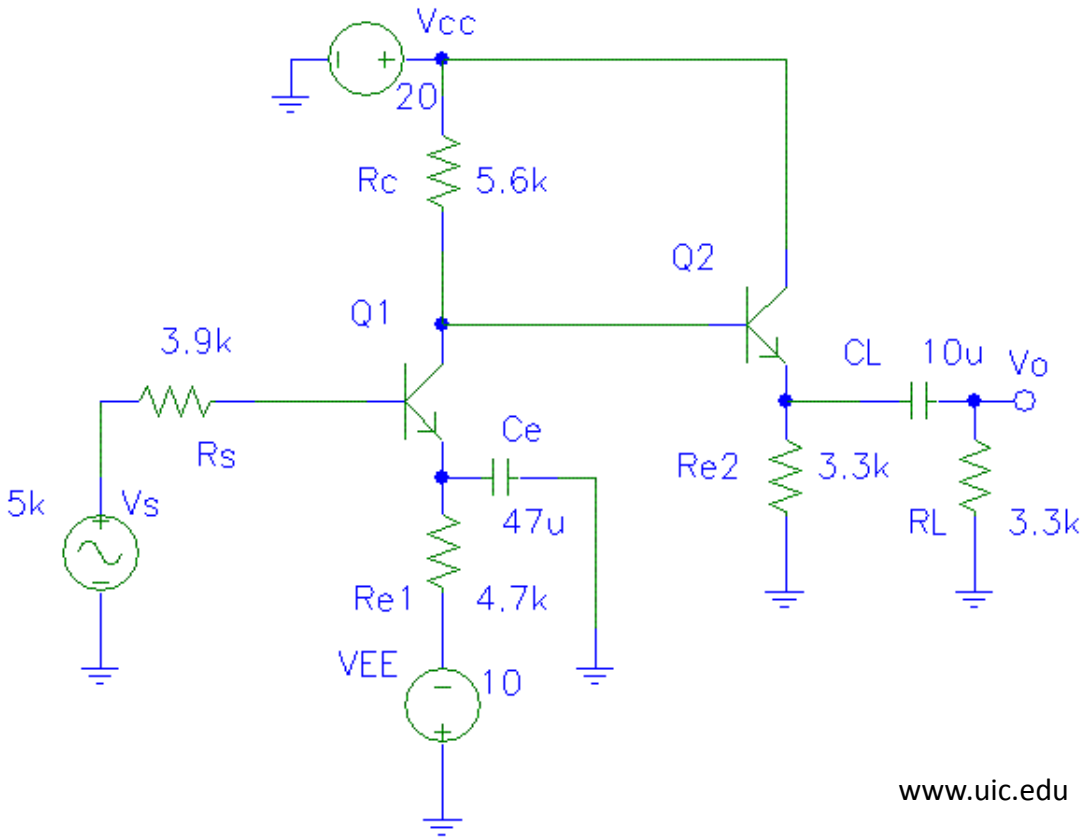
Loading



if one stage loads another stage (how?), the gain of that stage has to be estimated taking loading into account

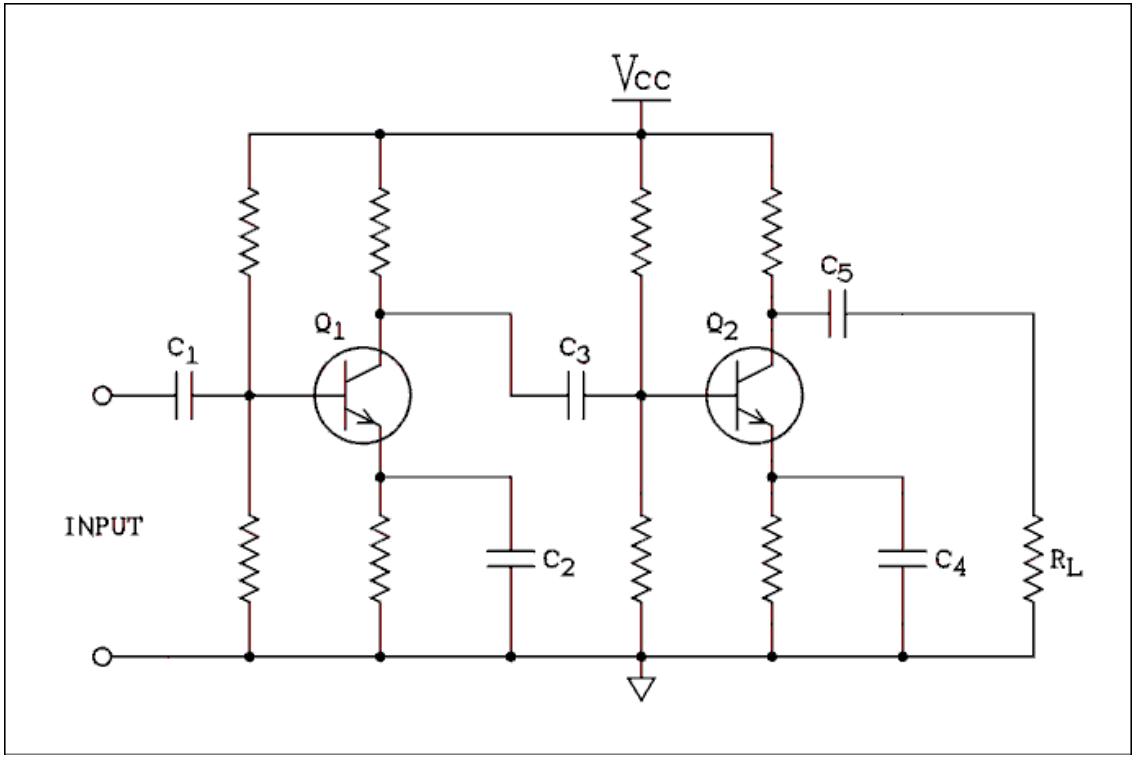
two different approaches can be used to evaluate the total gain

Some Configurations



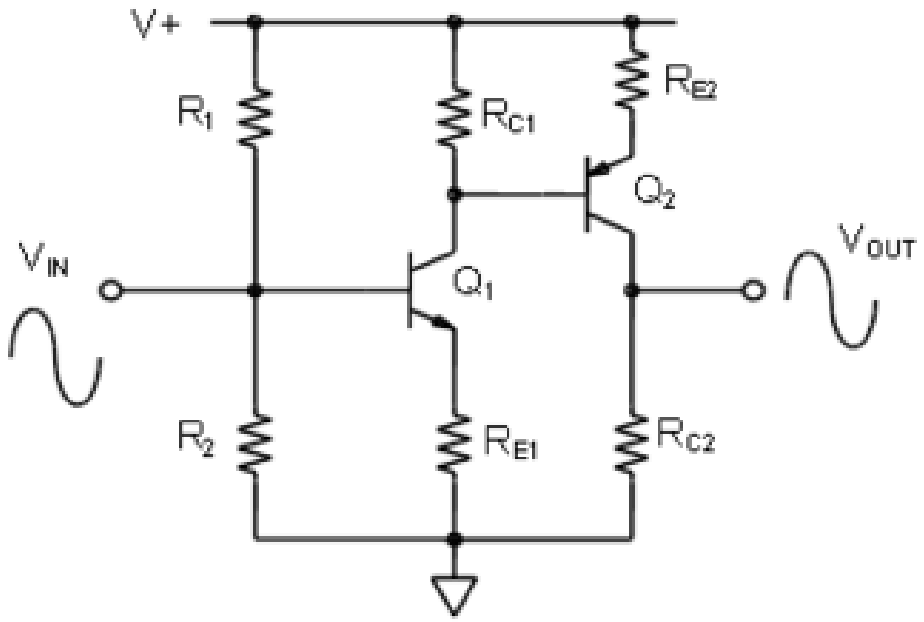
www.uic.edu

Configurations (Cont'd)



angelfire.com

Configurations (Cont'd)



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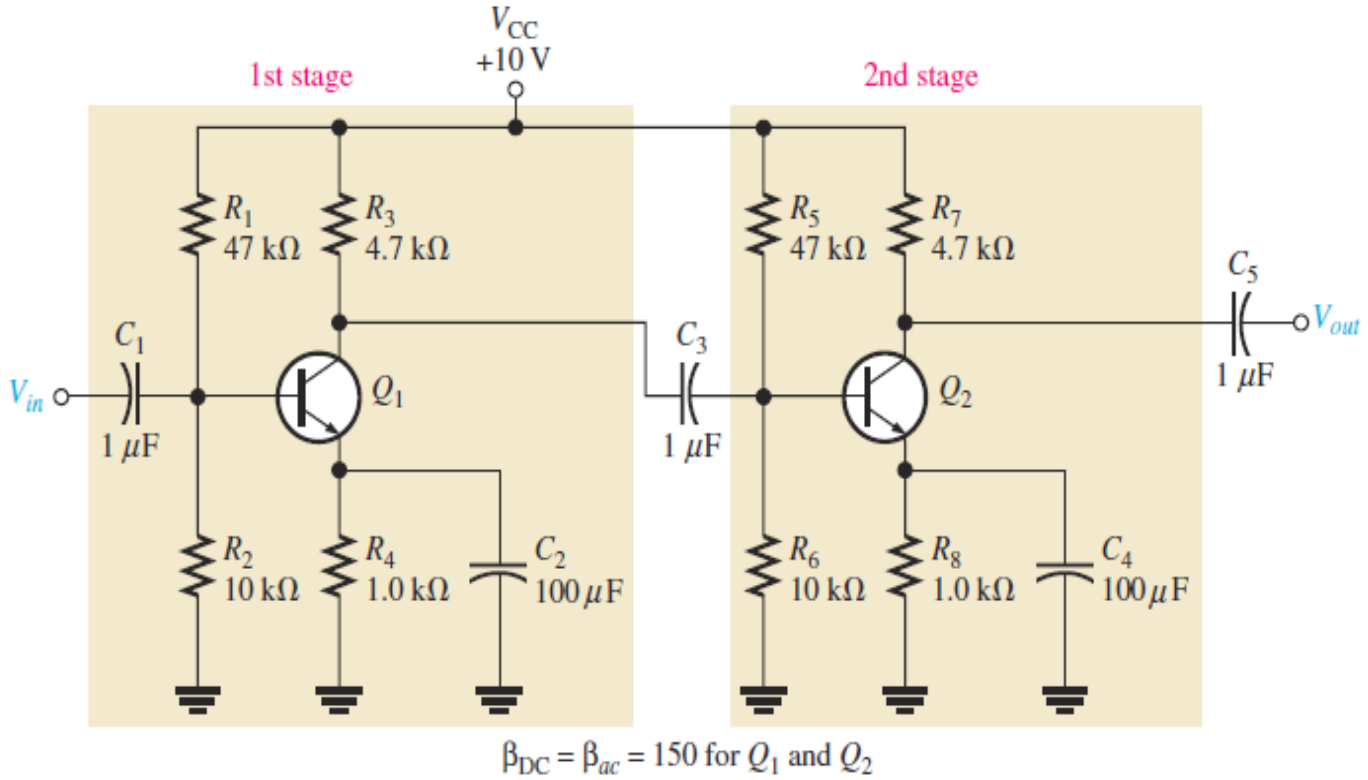
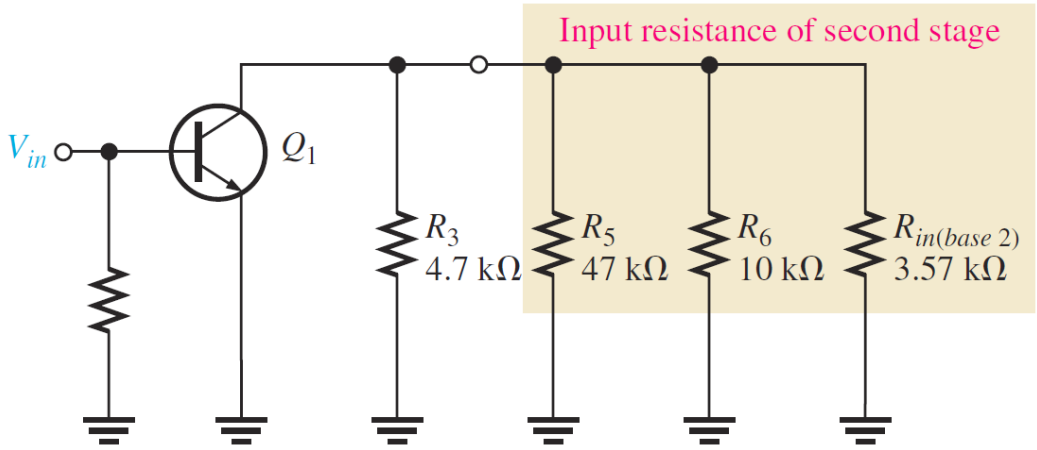
Common Emitter Loading



the effective collector resistance seen by the first stage is $R_3//R_5 //R_6 //R_{b,2}$. This affects the gain of the first stage.

the second stage is not loaded

Common Emitter Loading (Cont'd)



Rc_1 = 4.7 KΩ//47 KΩ//10 KΩ//3.57 KΩ = 1.63 KΩ

Av_1=1.63K/23.8=68.5