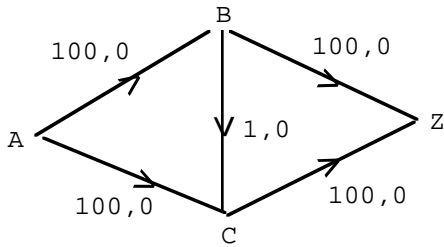


**problem 16**

Here is a network flow.



(a) Use the labeling algorithm in such a way as to get the max flow in just a few rounds.

Show all the rounds. (You can do that in email without drawing the picture.)

Remember, the algorithm is not over until you get stuck labeling.

When you are finished, display the saturated cut between your labeled and unlabeled vertices.

(b) Start again and use the labeling algorithm in such a way as to not get the max flow for many many many rounds (201 to be specific). In other words, use the algorithm correctly but very inefficiently.

Show a few rounds, enough to make the inefficient pattern clear.

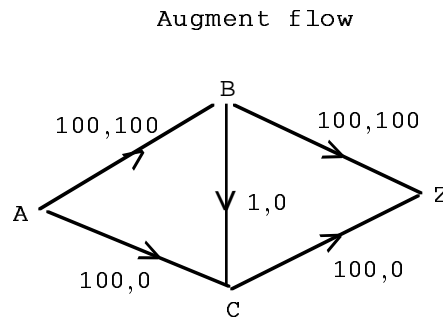
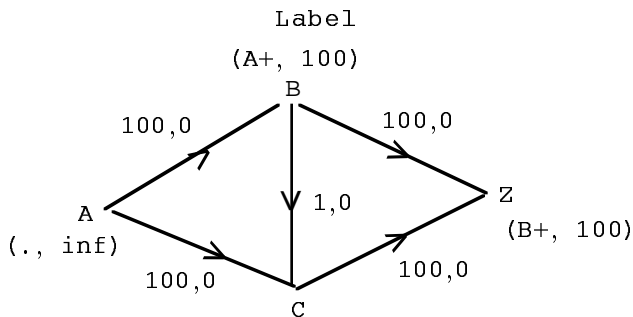
*warning* If Z gets a label like (B+, 100), the labeling algorithm says you must augment the flow by 100. You cannot be inefficient by deciding to augment by less than what the Z label allows.

In this problem you must be inefficient but still legal.

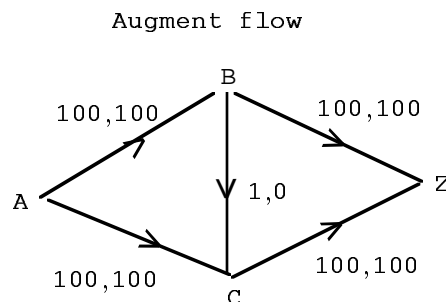
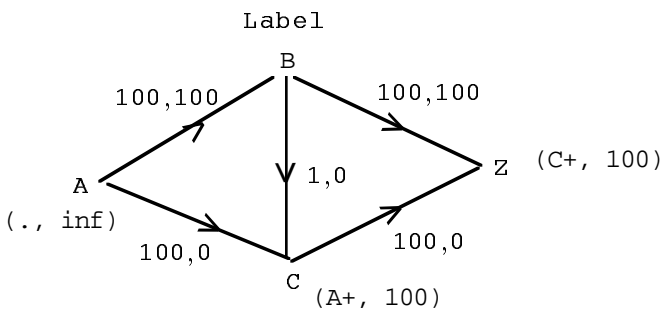
**solution 16**

(a)

*round 1*



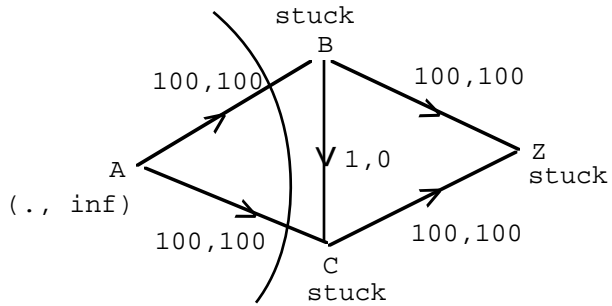
*round 2*



round 3

I labeled and got stuck.

Here is the cut between the labeled vertices (A) and the stuck vertices (B, C, Z).



The cut is saturated.

Now that I got stuck labeling, the algorithm is finished.

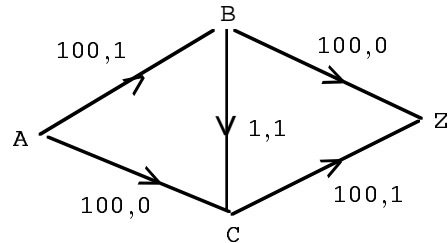
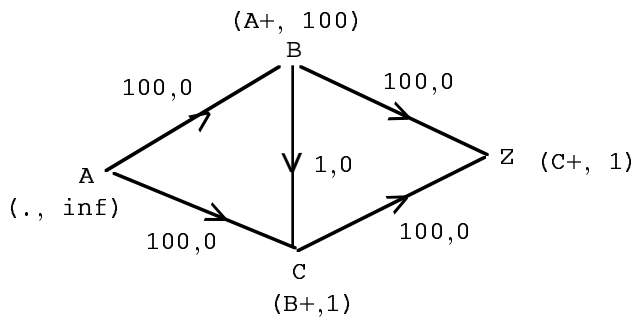
The max flow is 200.

(b)

round 1

Label

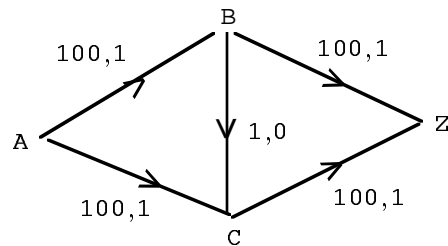
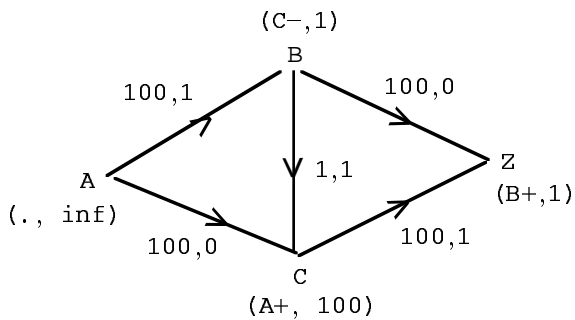
Augment



round 2

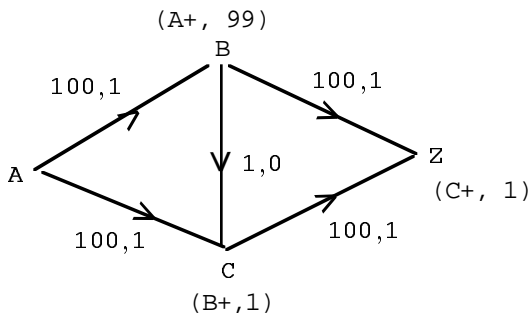
Label

Augment

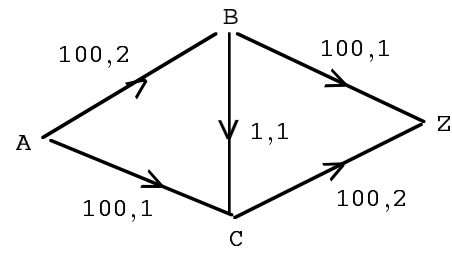


round 3

Label

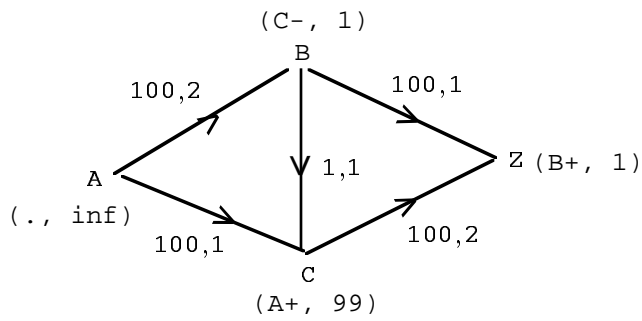


Augment

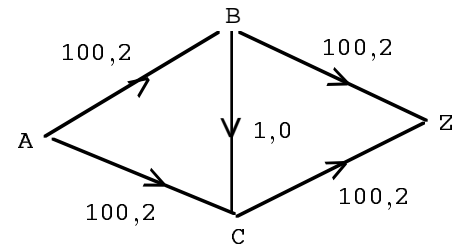


round 4

Label



Augment



And so on.

At this rate you will finally get stuck, and the algorithm will be over, on the 201st round.