Economics 311 — Fall 2017
Daily Problem #19 — November 8

This problem investigates the Granger causality relations between U.S. GDP growth (usgr) and Canadian GDP growth (cgr) using quarterly data over the period 1975:2 – 2011:4. The analysis was performed in Stata using a two-variable vector autoregression (VAR), in which each variable is regressed on lagged values of both itself and the other variable. Analysis using conventional tests (such as AIC and BIC) suggests that one lag is sufficient. The two VAR regressions are below:

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
usgr						
usgr						
L1.	.2512771	.0898504	2.80	0.005	.0751735	.4273807
cgr						
L1.	.2341061	.0975328	2.40	0.016	.0429453	.4252668
_cons	1.494612	.3354005	4.46	0.000	.8372394	2.151985
cgr						
usgr						
L1.	.3759117	.0726571	5.17	0.000	.2335065	.5183169
cgr						
L1.	.2859551	.0788694	3.63	0.000	.1313739	.4405362
_cons	.8755421	.2712199	3.23	0.001	.3439609	1.407123

Since there is only one lagged coefficient for each variable in each equation, the t test in the table equivalent to the usual F test used when there are multiple lag coefficients. The four possible outcomes of a two-way Granger causality test are summarized in the table below:

	Fail to reject H_0: Lagged *usgr* does not affect *cgr*	**Reject** H_0: Lagged *usgr* does not affect *cgr*
Fail to reject H_0: Lagged *cgr* does not affect *usgr*	$cgr \not\Rightarrow usgr$ $usgr \not\Rightarrow cgr$ (no Granger causality)	$cgr \not\Rightarrow usgr$ $usgr \Rightarrow cgr$ (*usgr* Granger causes *cgr*)
Reject H_0: Lagged *cgr* does not affect *usgr*	$cgr \Rightarrow usgr$ $usgr \not\Rightarrow cgr$ (*cgr* Granger causes *usgr*)	$cgr \Rightarrow usgr$ $usgr \Rightarrow cgr$ (bi-directional Granger causality, or feedback)

What do you conclude about Granger causality between U.S. and Canadian growth?