Signage Safety: Looking at the Connection Between Road Signs, Pedestrian Crossing Conditions, and Hit & Run Police Calls in Howard County, Maryland

Research Question:

How do road signage and pedestrian crossing conditions affect the prevalence of hit & run police calls in Howard County, Maryland? More specifically, do signs encouraging driver safety and awareness reduce hit & run calls? Do marked pedestrian crossing points and lower speed limits reduce hit & run calls?

Background Research:

Richard Tay, Upal Barua, and Lina Kattan, in their article "Factors Contributing to Hit-and-Run in Fatal Crashes," found that stop signs are associated with lower rates of hit-and run incidences but warning signs and signal signs are not. They also found that there is no specific speed limit that is associated with lower rates of hit-and run incidences (Tay, Barua and Kattan 2009). Martha Hijar, James Trostle, and Mario Bronfman, in the article "Pedestrian Injuries in Mexico: A Multi-Method Approach," found that in Mexico City, pedestrian-car collisions are most likely to occur in areas with heavy traffic flows that lack demarcated pedestrian crosswalks or crossing signals (Hijar, Trostle and Bronfman 2003).

REGRESSION ANALYSIS TABLE FOR VARIABLES EFFECTING HIT & RUN CALLS

| Variable	Coefficient	Std Error	t-Statistic	Probability	VIF
Intercept	0.014	0.035	0.384	0.701	------------
Stop Signs	0.053	0.014	3.8	0.000*	1.43
Speed Limit Signs	0.08	0.026	3.029	0.002*	1.472
Campaign Signs	-0.397	0.178	-2.223	0.026*	1.017
Speed Limit	0.015	0.002	10.153	0.000*	1.053
Cross-walks	1.549	0.078	19.834	0.000*	1.038

*Adjusted R-Squared: 0.083018

Data & Measures

- Independent Variables: Number of Stop Signs, Number of Speed Limit Signs, Number of "Keep Kids Alive, Drive 25" Campaign Signs, Average Speed Limit, Number of Painted Crosswalks

- Dependent Variable: Number of Hit & Run Police Calls
- Unit of Analysis: Police Call Grid Cell
- Methods of Analysis: Density Analysis for Dependent Variable, Hotspot Analysis for Dependent Variable, Cluster/Outlier Analysis for Dependent Variable, Ordinary Least Squares (OLS) Regression for Independent and Dependent Variables

Conclusions:

- All independent variables are statistically significant, but only campaign signs and pedestrian crosswalks have a large impact
    - "Keep Kids Alive, Drive 25" campaign signs have a negative effect on the number of hit & run police calls
    - Roughly 2.5 unit increase in campaign signs   1 unit decrease in hit & run police calls
    - Causes: increased community awareness and heightened driver caution
    - Recommendations: 1) widen campaign to cover all of Howard County, 2) increase number of signs on the streets, and 3) raise public awareness about the campaign

- Pedestrian crosswalks have a positive effect on hit & run calls
    - 1 unit increase in crosswalks = 1.55 unit increase in hit & run police calls
    - Causes: population density, heavy foot traffic, and pedestrian or driver inattentiveness
    - Recommendations: 1) increase police presence in crosswalk-dense areas, 2) prioritize driver inattentiveness during traffic stops, and 2) create campaign encouraging safe pedestrian street-crossing practices
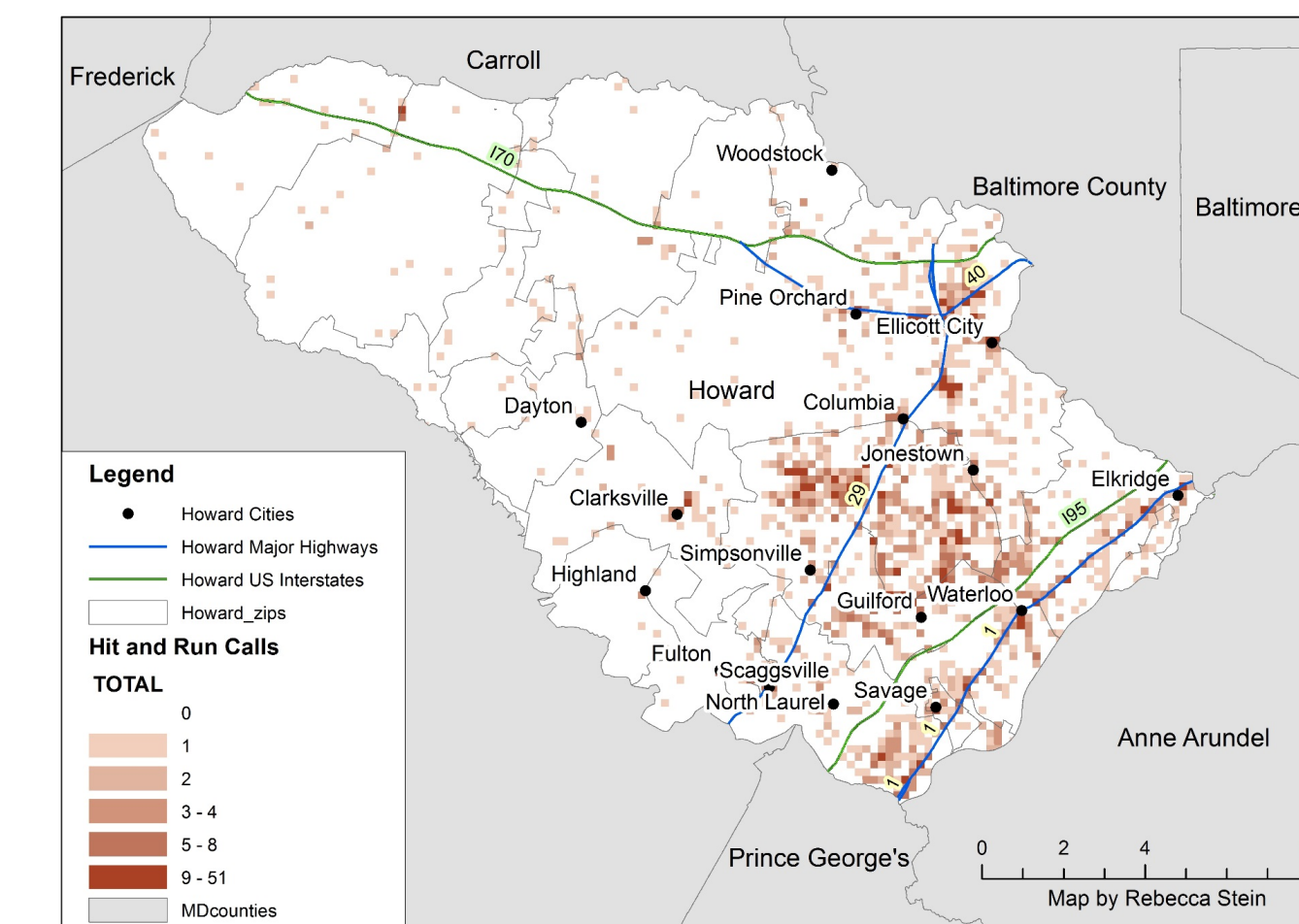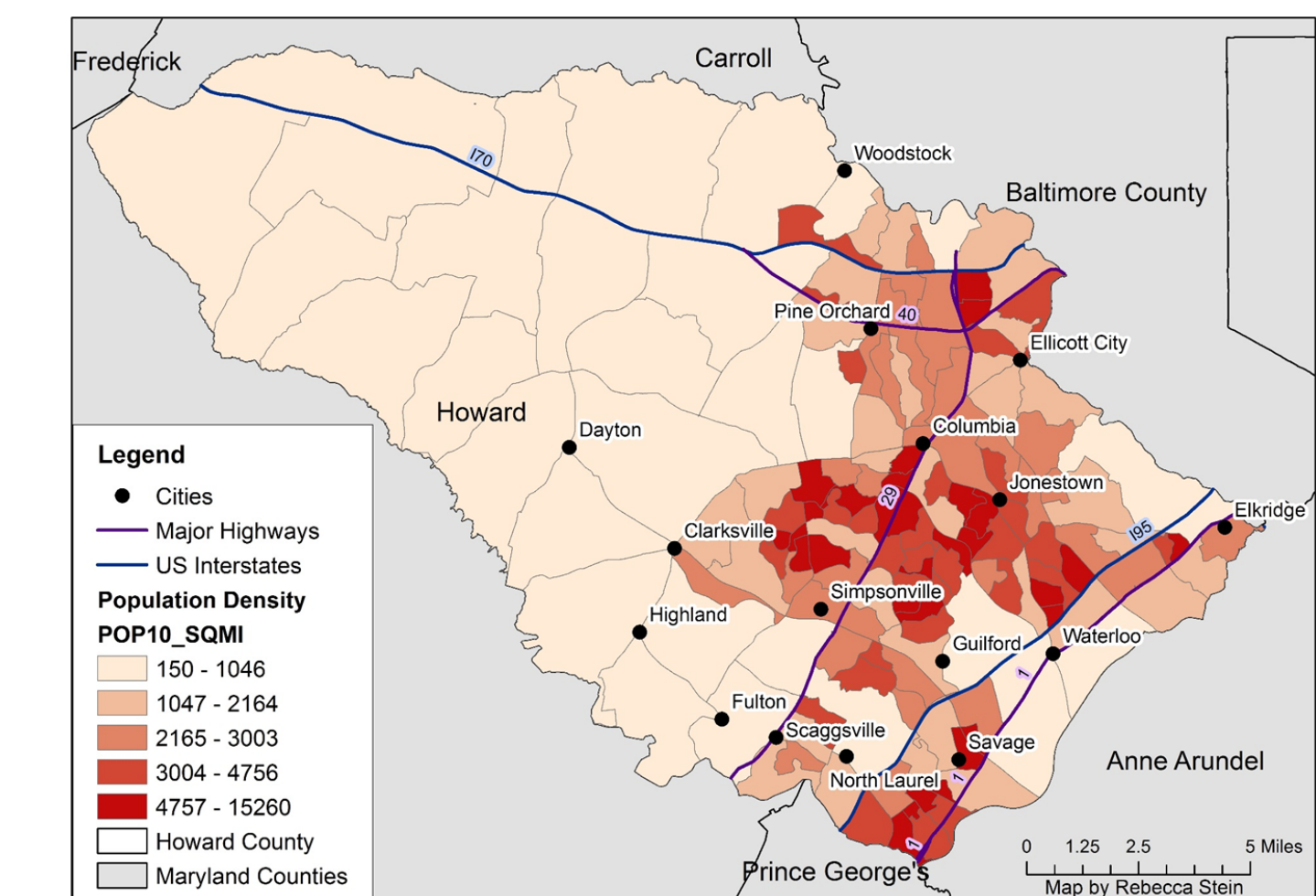
POINT VARIABLES POTENTIALLY EFFECTING HIT & RUN CALLS
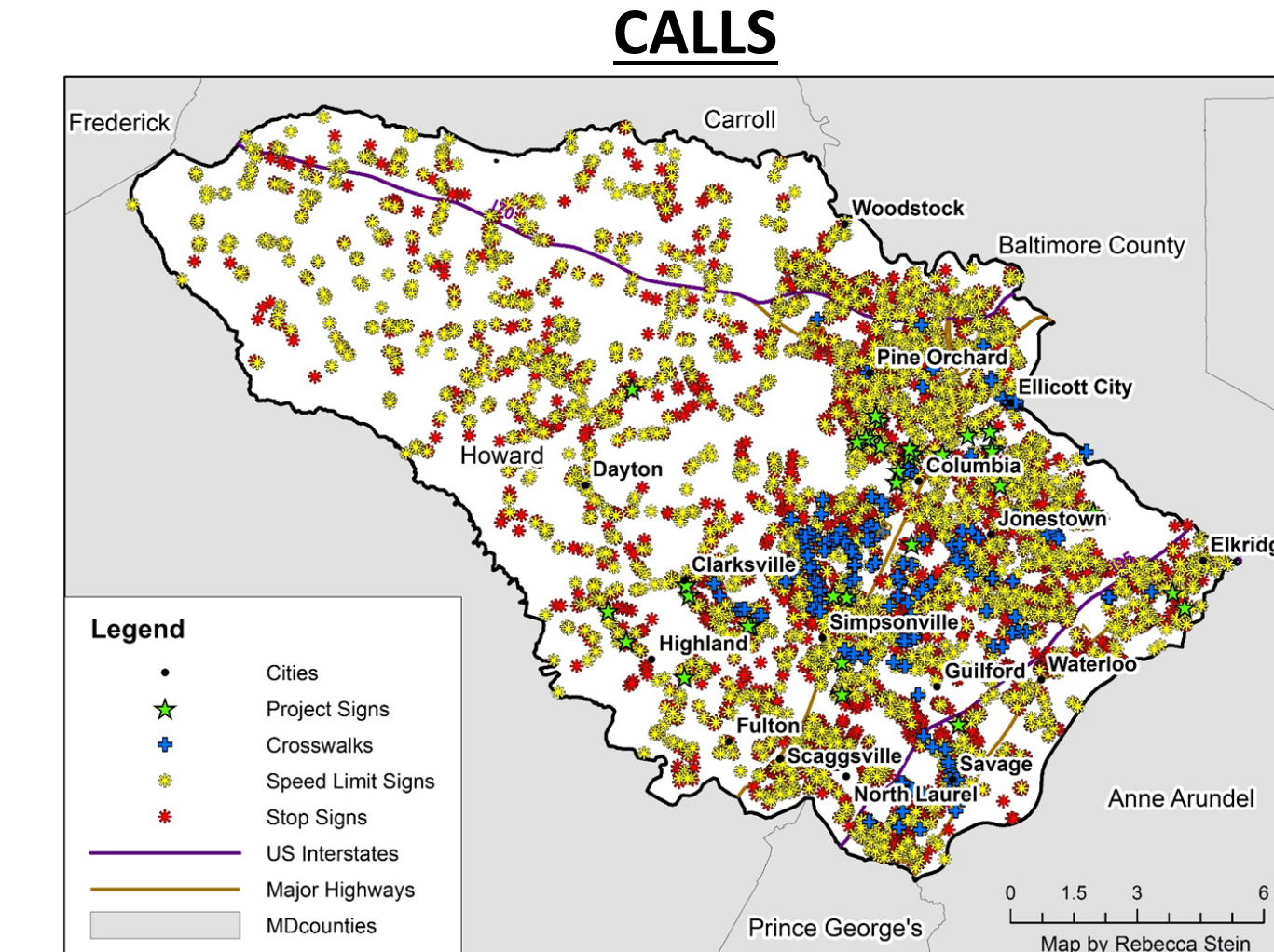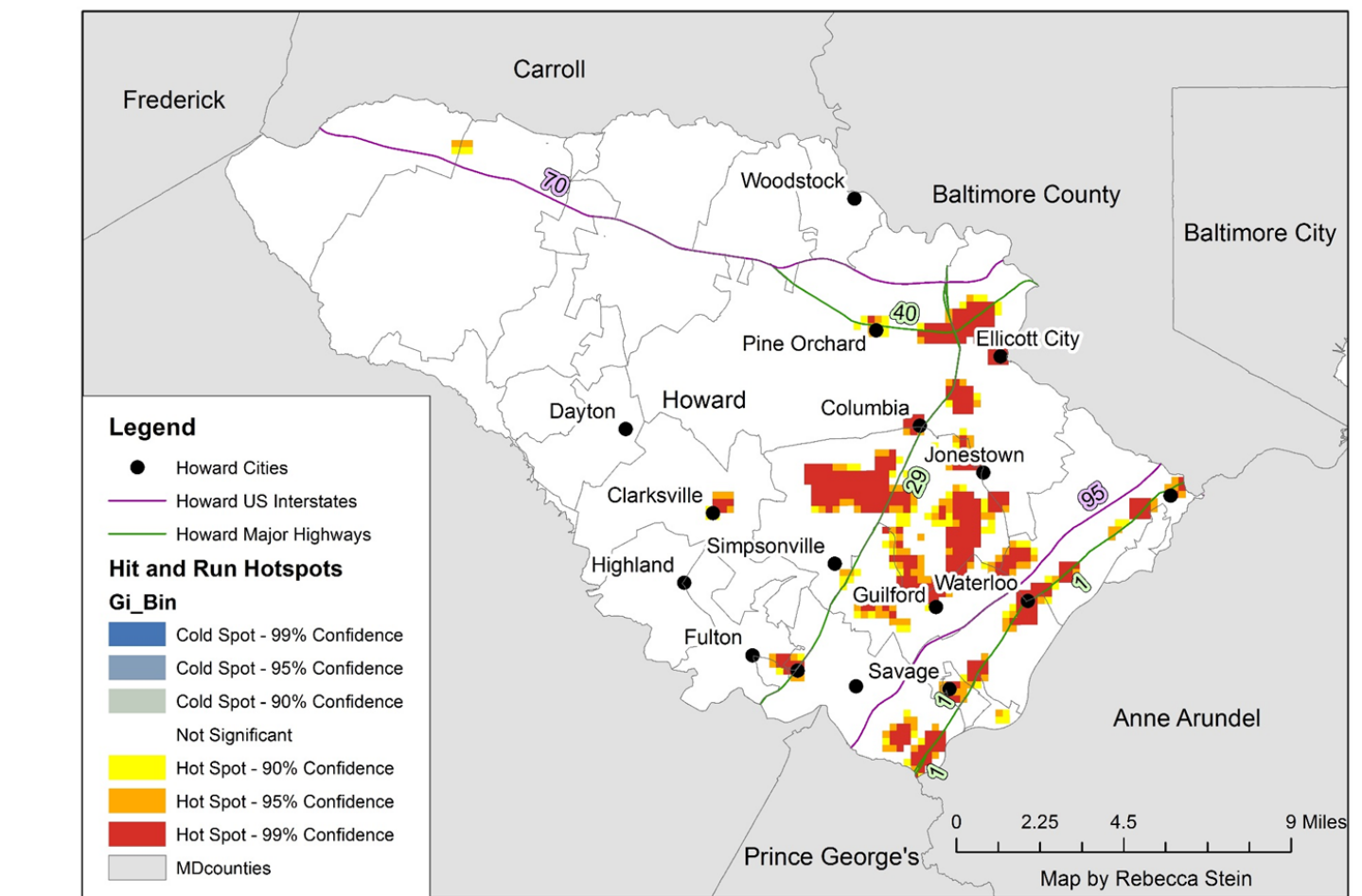

HIT & RUN CLUSTER AND OUTLIER ANALYSIS
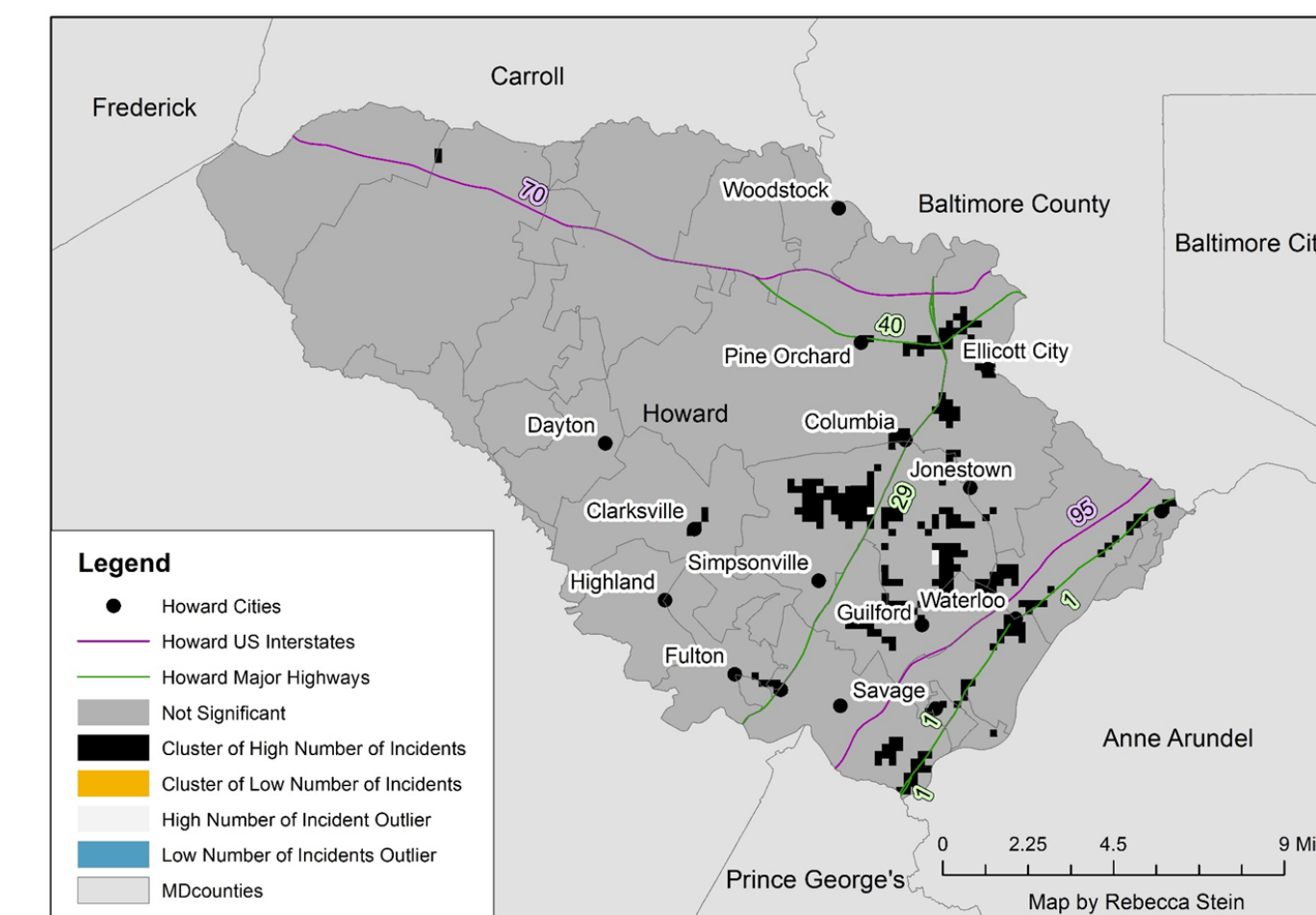
DENSITY OF HIT & RUN POLICE CALLS

GENERAL MAP OF HOWARD COUNTY WITH POPULATION DENSITY

HIT & RUN CALL HOTSPOT

SPEED LIMIT ROAD MAP FOR AVERAGE SPEED VARIABLE

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