Student Spring Break Behaviors and COVID-19 Transmission
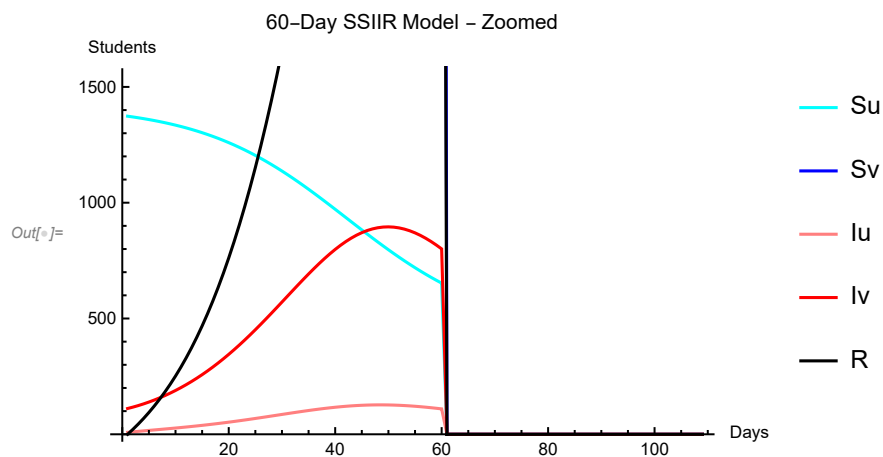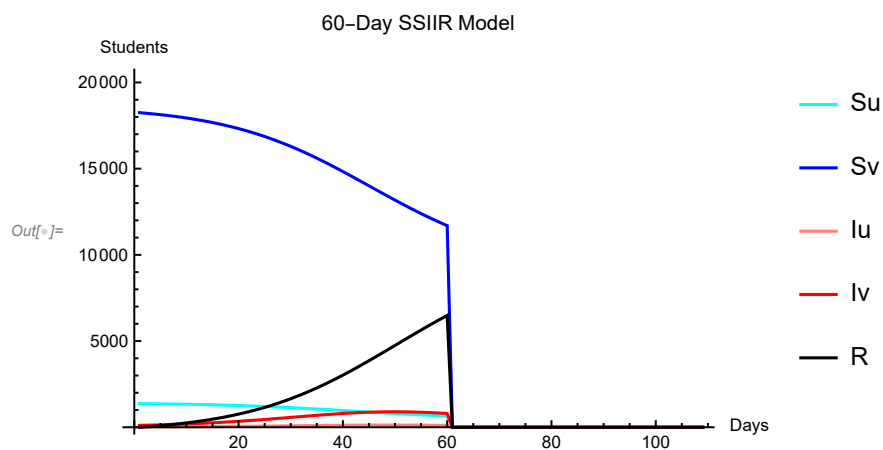
In[ ]:= **Brenna Mehl, Dawson Brown, Leo Pang, Aidan Holland**

Initial Values :

Campus Transmission Before Spring Break (Days 1-60)
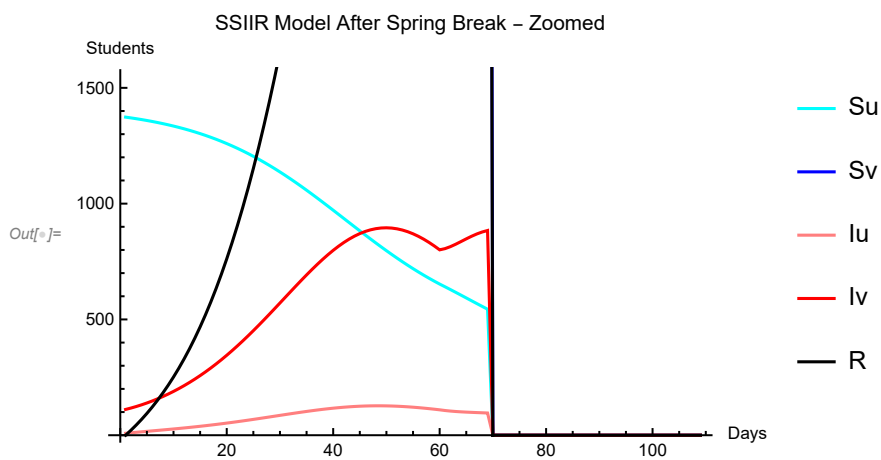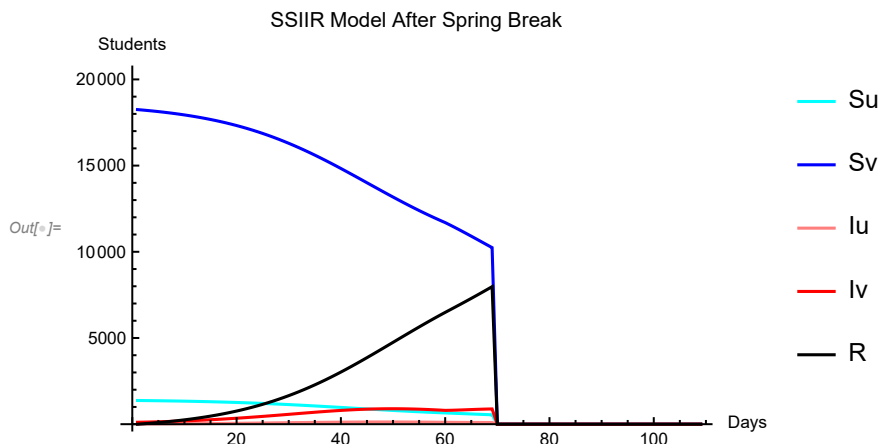
SIR Plots Before Break

Create Plots:

Out[ ]=

60–Day SSIIR Model

60–Day SSIIR Model – Zoomed

Spring Break Environment 1 (Days 61-69)

Spring Break Environment 2 (Days 61-69)

SIR Plots After Break

Create Plots:

SSIIR Model After Spring Break

SSIIR Model After Spring Break – Zoomed

Campus Transmission After Spring Break (Days 70-109)
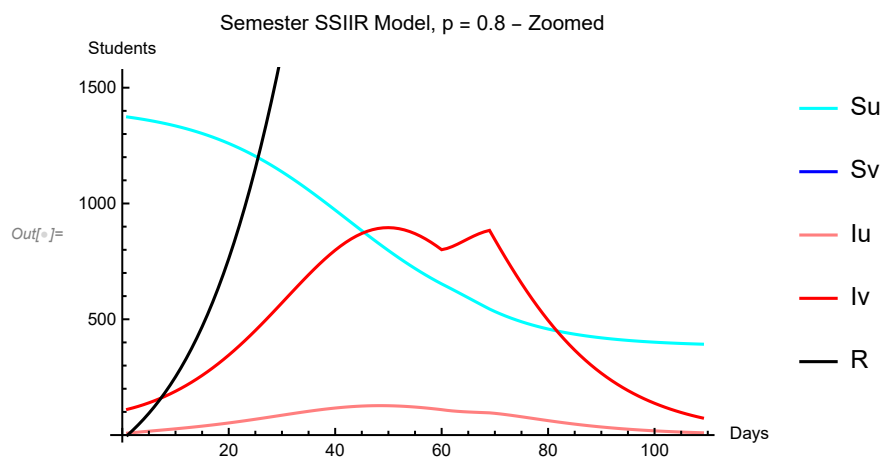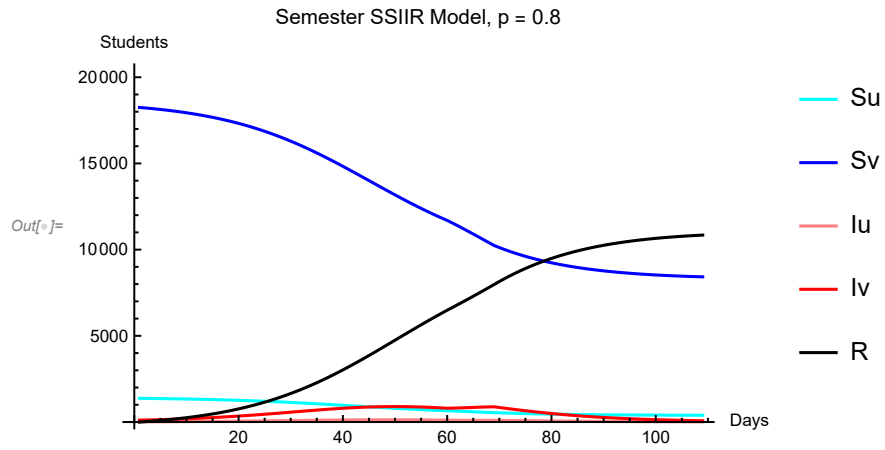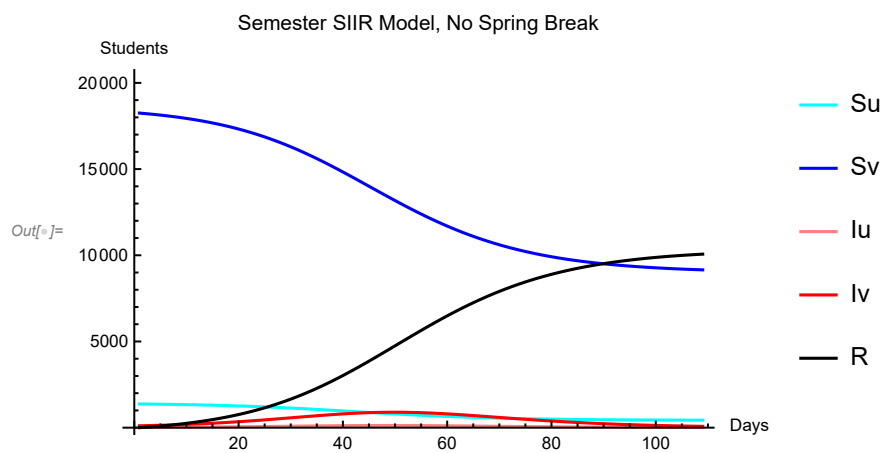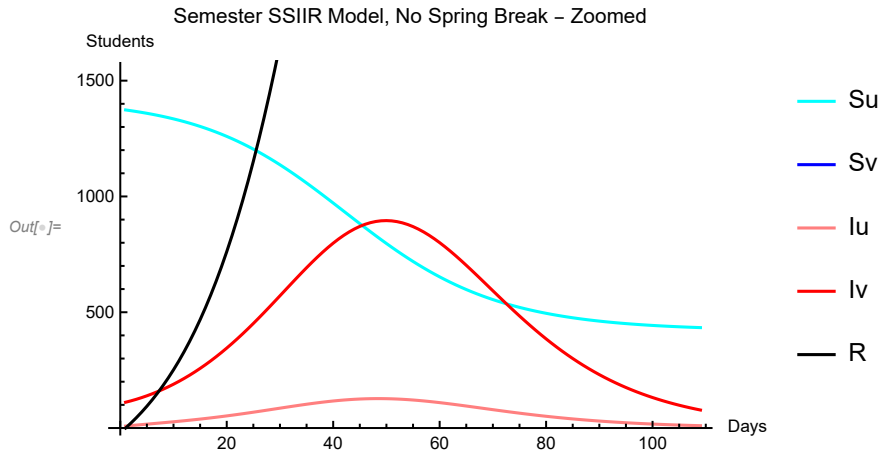
SIR Plots at End of Semester

Create Plots:

```
plotSu = ListPlot[tabSu, Joined → True, PlotStyle → Cyan, PlotLegends → {"Su"}];
plotSv = ListPlot[tabSv, Joined → True, PlotStyle → Blue, PlotLegends → {"Sv"}];
plotIu = ListPlot[tabIu, Joined → True, PlotStyle → Pink, PlotLegends → {"Iu"}];
plotIv = ListPlot[tabIv, Joined → True, PlotStyle → Red, PlotLegends → {"Iv"}];
plotR = ListPlot[tabR, Joined → True, PlotStyle → Black, PlotLegends → {"R"}];
Show[plotSu, plotSv, plotIu, plotIv, plotR, PlotRange → {0, 19742},
 AxesLabel → {"Days", "Students"}, PlotLabel → "Semester SSIIR Model, p = 0.8"]
Show[plotSu, plotSv, plotIu, plotIv, plotR, PlotRange → {0, 1500},
 AxesLabel → {"Days", "Students"}, PlotLabel → "Semester SSIIR Model, p = 0.8 – Zoomed"]
```

Semester SSIIR Model, p = 0.8

Students

Out[◦]=

Semester SSIIR Model, p = 0.8 – Zoomed

Students

Out[◦]=

Compare to a Model Where No Spring Break Occurs:

Semester SIIR Model, No Spring Break

Students

Out[◦]=

Semester SSIIR Model, No Spring Break – Zoomed

Out[◦]=

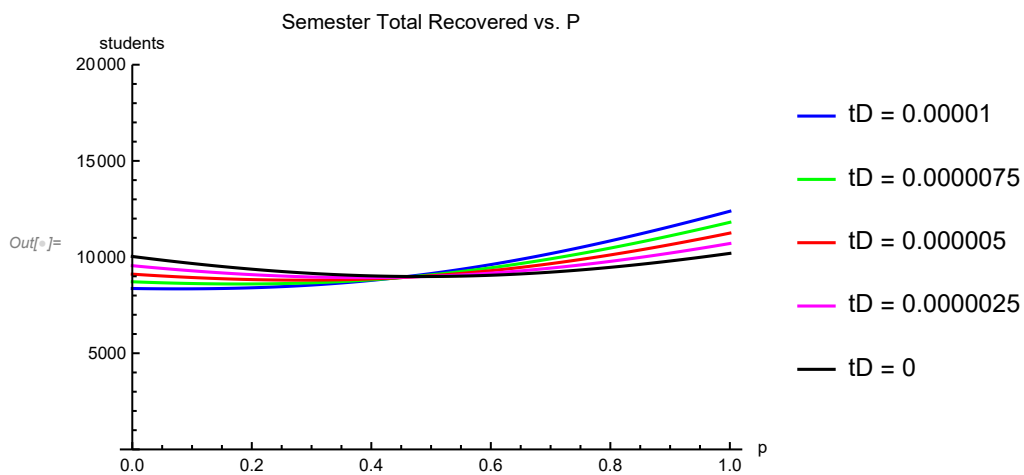## Analysis

Creating a Function

Running Function, tD = 0.0000100

Running Function, tD = 0.0000075

Running Function, tD = 0.0000050

Running Function, tD = 0.0000025

Running Function, tD = 0:

```
In[◦]:= Show[plotTD1, plotTD75, plotTD5, plotTD25,
  plotTD0, PlotLabel → "Semester Total Recovered vs. P",
  AxesLabel → {"p", "students"}, PlotRange → {0, 20000}]
```

Semester Total Recovered vs. P

Out[◦]=


```
In[◦]:= plotNoBreak =
  Plot[rNoBreak, {x, 0, 1}, PlotStyle → Dashed, PlotLegends → {"No Spring Break"}];
```

In[ ]:= **Show[plotTD1, plotTD75, plotTD5, plotTD25, plotTD0,**
  plotNoBreak, PlotLabel → "Semester Total Recovered vs. P (zoomed)",
  AxesLabel → {"p", "students"}, PlotRange → {8000, 13000}]

Semester Total Recovered vs. P (zoomed)

Legend:
- tD = 0.00001 (blue)
- tD = 0.0000075 (green)
- tD = 0.000005 (red)
- tD = 0.0000025 (magenta)
- tD = 0 (black)
- No Spring Break (dashed)

Out[ ]=