

# Fault Tolerant Computing

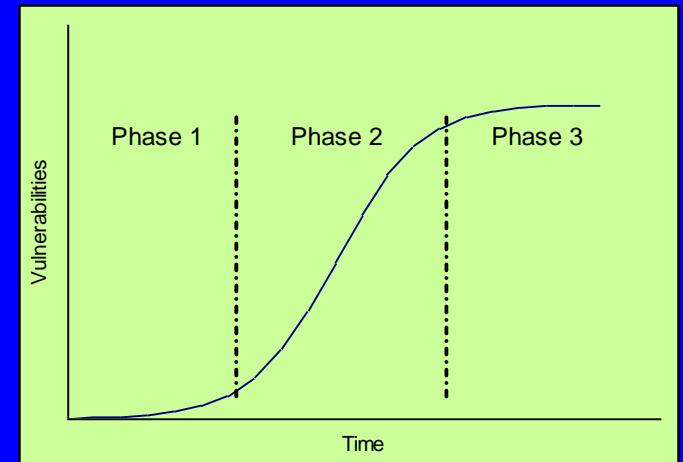
CS 530DL

## Additional Lecture Notes Coronavirus disease 2019 (COVID-19)

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# Time – vulnerability discovery model

- Each vulnerability is recorded.
  - Available [NVD, vender etc].
  - Needs compilation and filtering.
- Data show three phases for an OS.
- Assumptions:
  - The discovery is driven by the rewards factor.
  - Influenced by the change of market share.



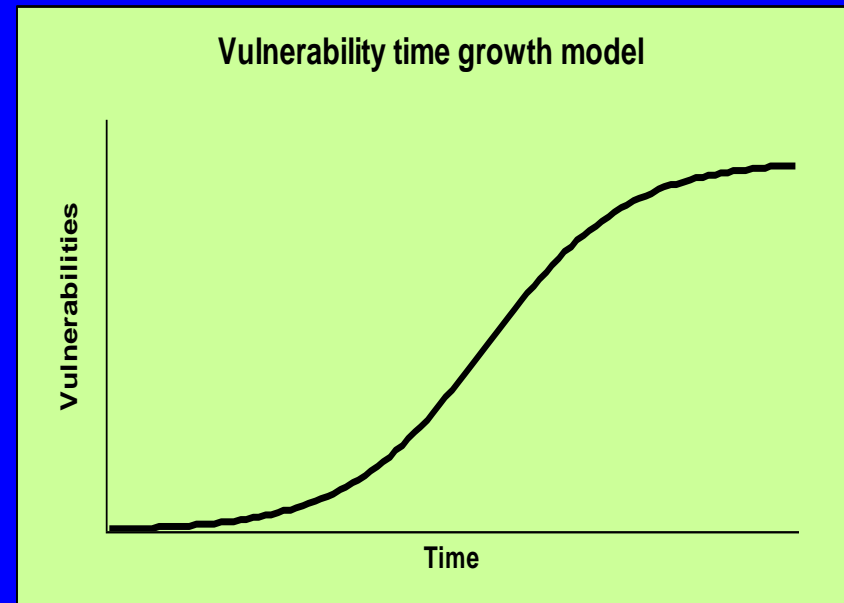
# Time–vulnerability Discovery model

3 phase model S-shaped model.

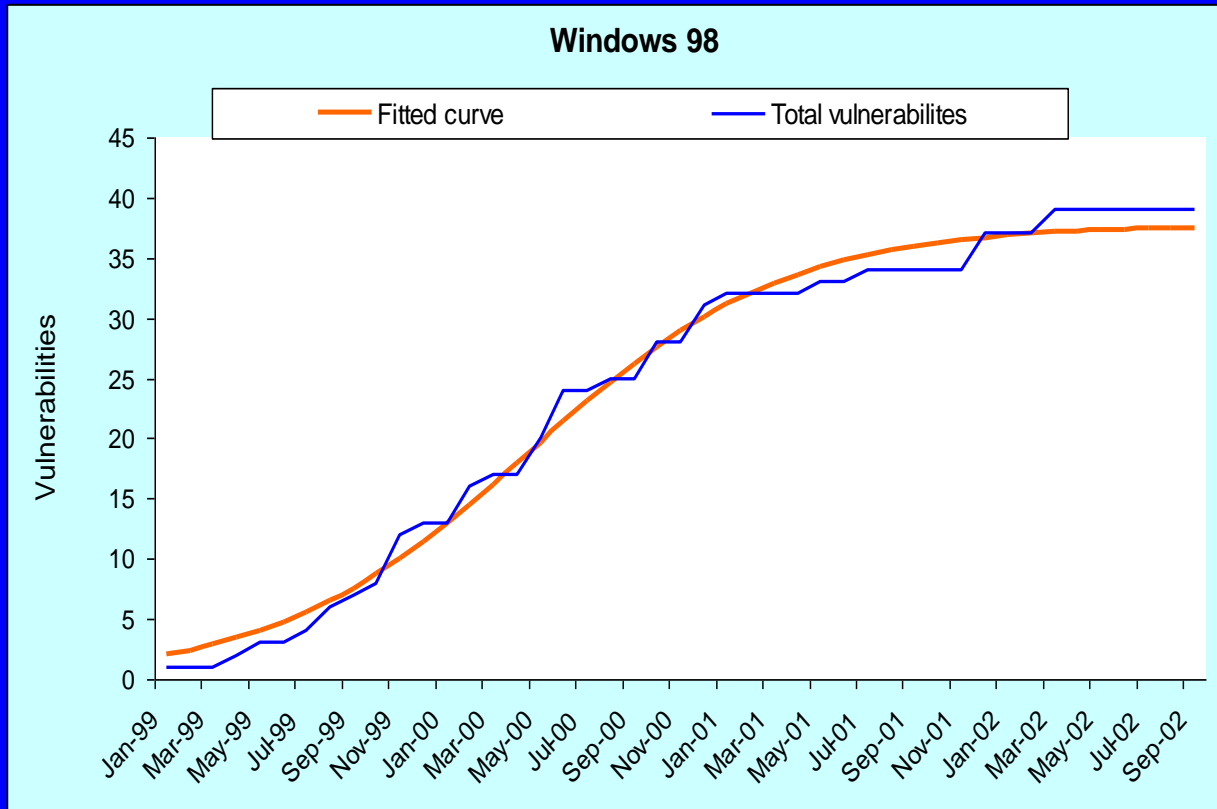
- Phase 1:
  - Installed base –low.
- Phase 2:
  - Installed base–higher and growing/stable.
- Phase 3:
  - Installed base–dropping.

$$\frac{dy}{dt} = Ay(B - y)$$

$$y = \frac{B}{BCe^{-ABt} + 1}$$



# Time-based model: Windows 98



	Windows 98
A	0.004873
B	37.7328
C	0.5543
$\chi^2$	7.365
$\chi^2_{\text{critical}}$	60.481
P-value	1- 7.6x10 <sup>-11</sup>

# Major Epidemics

	Dates	Mortality rate %	Basic reproduction number
Seasonal Flu		0.1	
1918 influenza pandemic	1918	2-3 [s]	2-3
SARS	2002–2003	9.6 [s]	2-5
2009 flu pandemic	2009		1.75 [s]
MERS	2012–2013	34.4 [s]	0.3-0.8
COVID-19	2019-2020	3.4 [s]	1.4-3.8

# AI Predicts Coronavirus Could Infect 2.5 Billion And Kill 53 Million

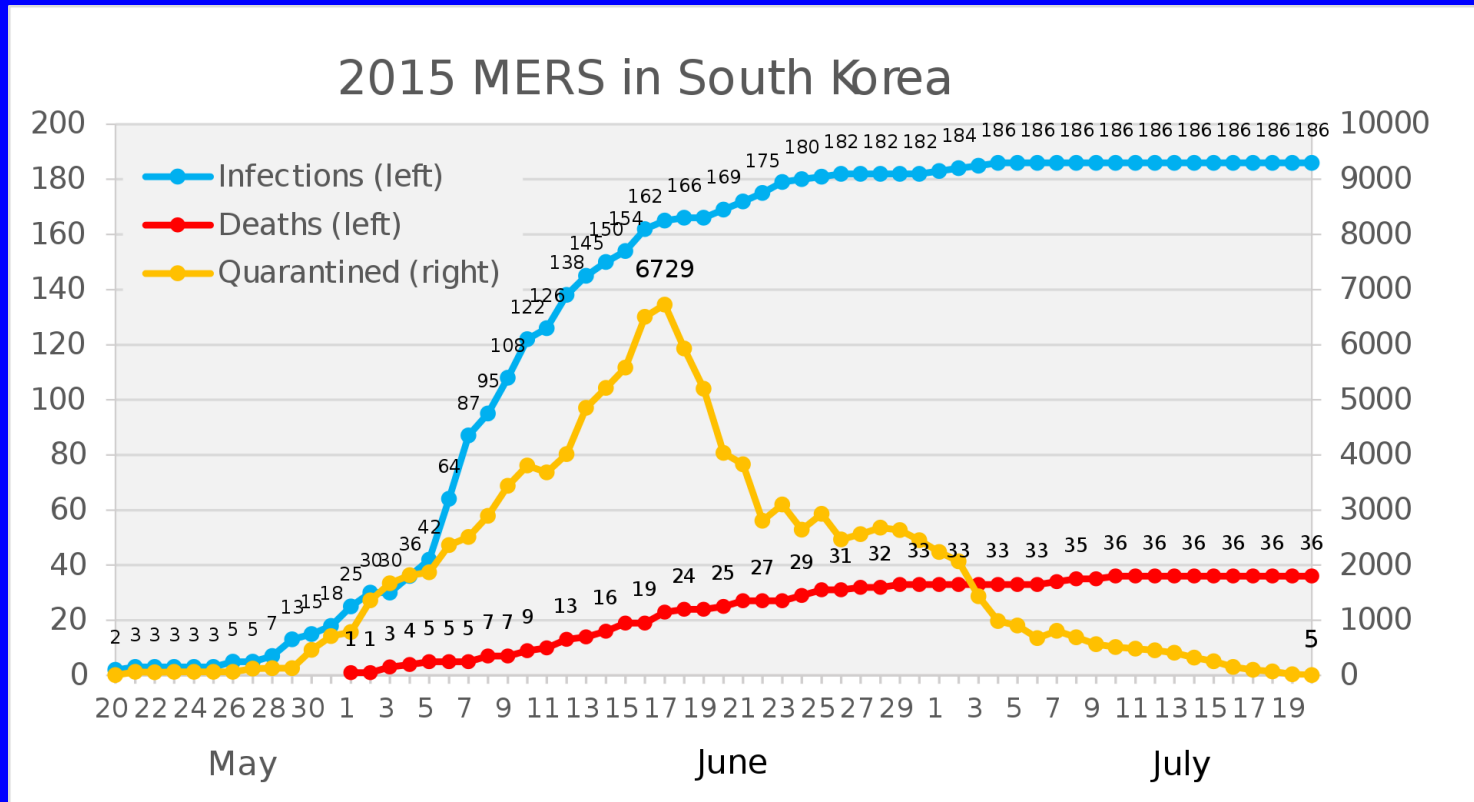
<b>WUHAN CORONAVIRUS</b>				
<b>Past 2 Weeks</b>				
	1/15	1/20	1/25	1/31
<b>ACTUAL</b> Confirmed Cases	41	291	1,975	11,943
<b>ACTUAL</b> Deaths	0	6	56	259

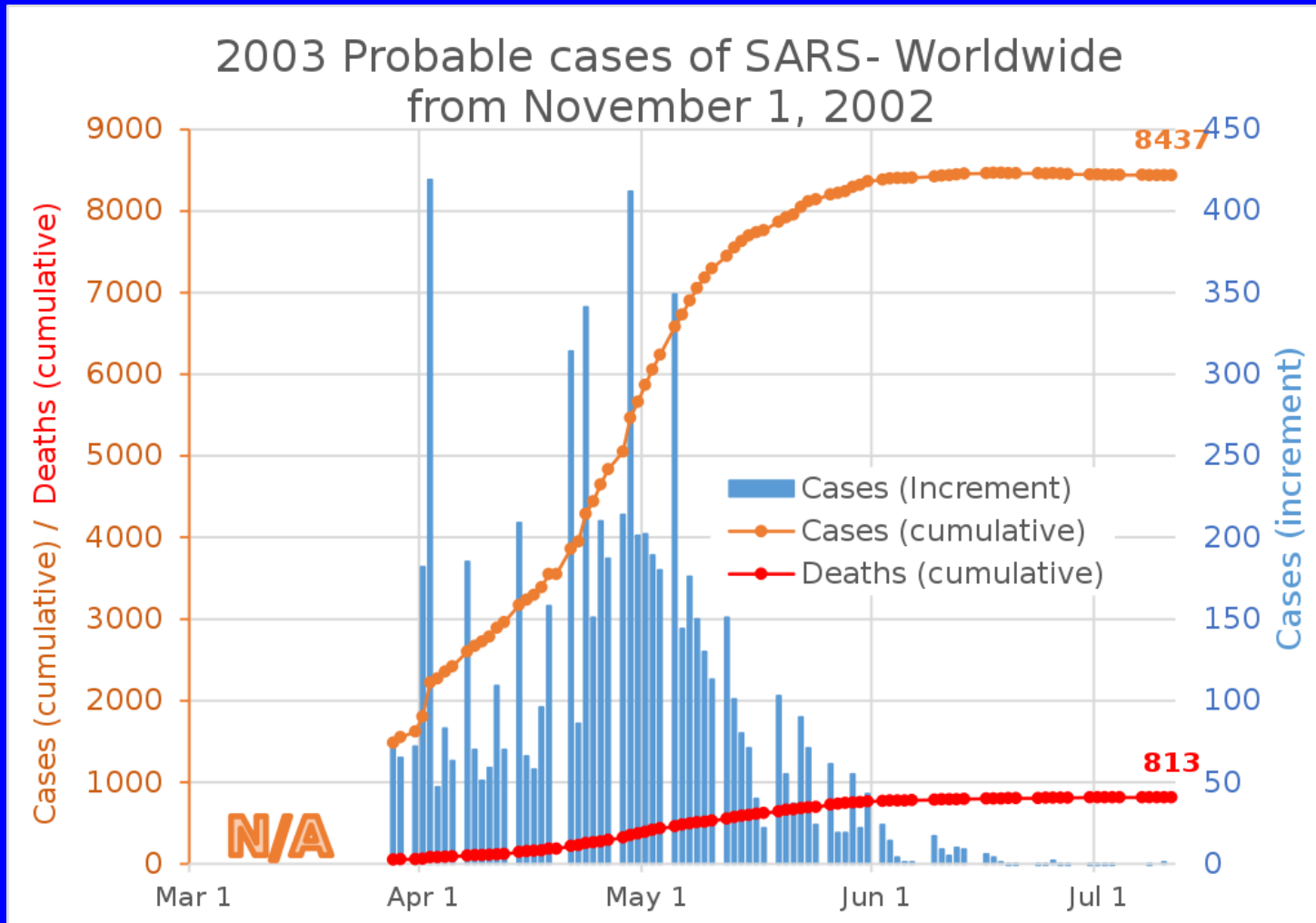
<b>WUHAN CORONAVIRUS</b>				
<b>Forecast</b>				
	7 DAYS	14 DAYS	30 DAYS	45 DAYS
<b>Projected</b> Confirmed Cases	49,924	208,690	95,887,916	2,521,371,095
<b>Projected</b> Deaths	1,048	4,382	2,013,646	52,948,793

James Ross, co-founder of fintech startup HedgeChatter

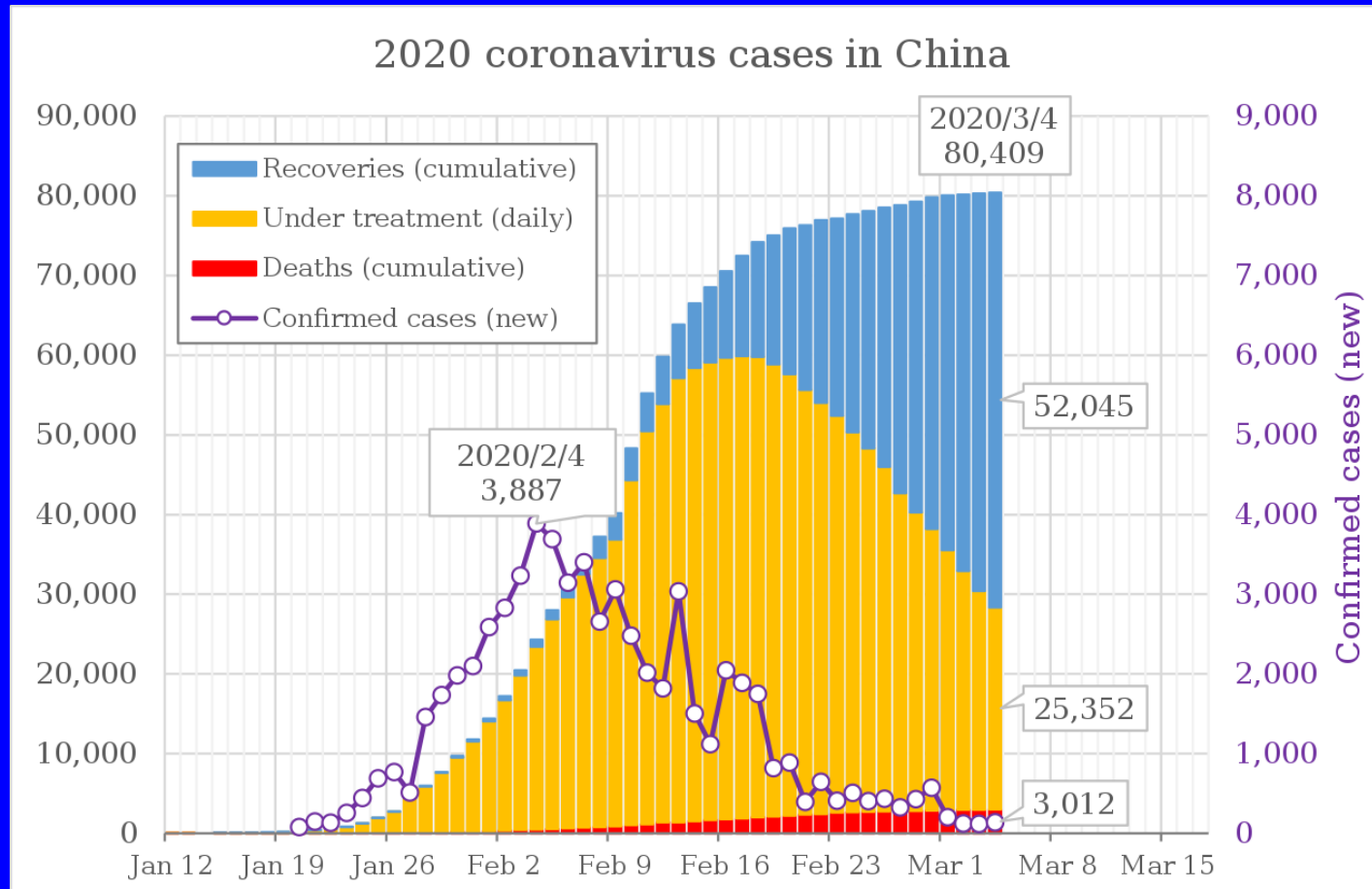
# Middle East respiratory syndrome outbreak in South Korea



# Probable cases of SARS - Worldwide



# 2020 coronavirus patients in China



# World MERS outbreak

