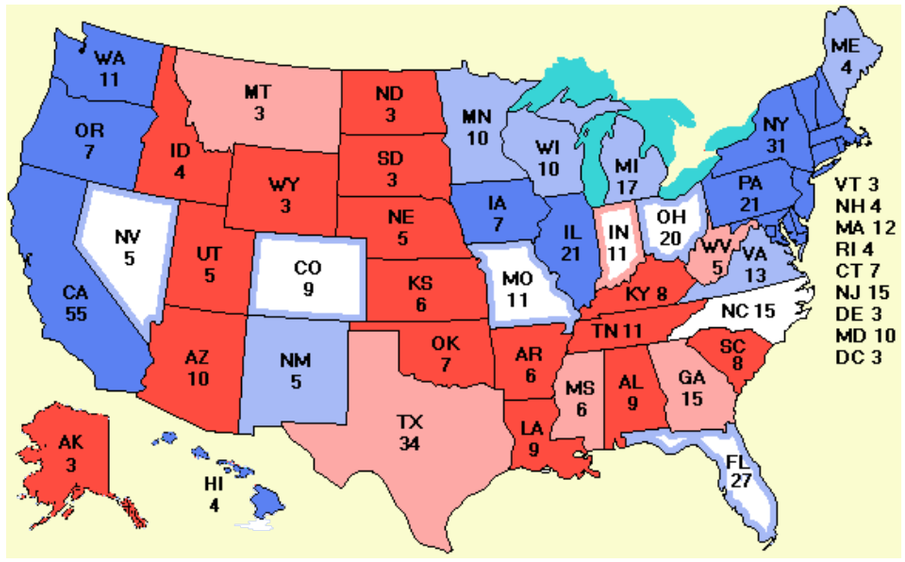
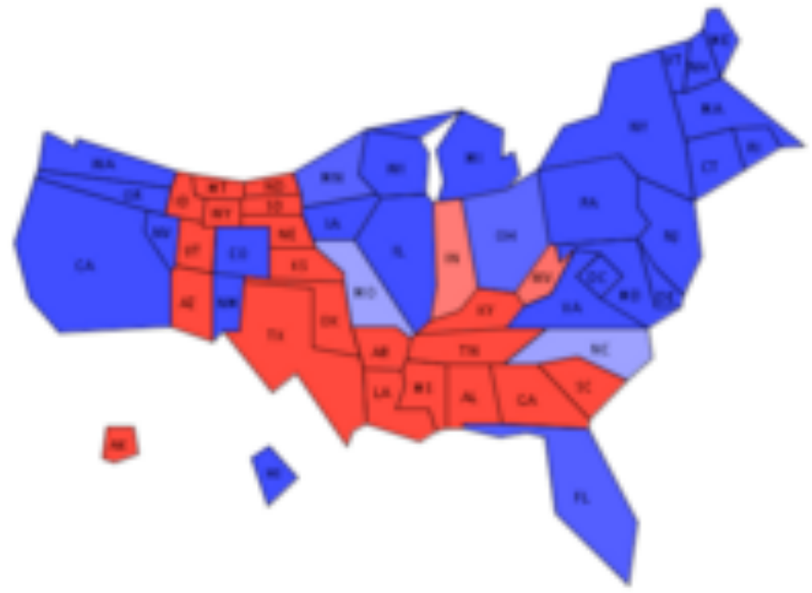
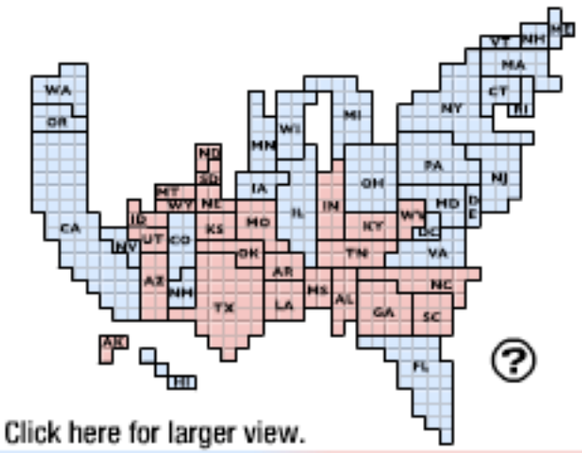
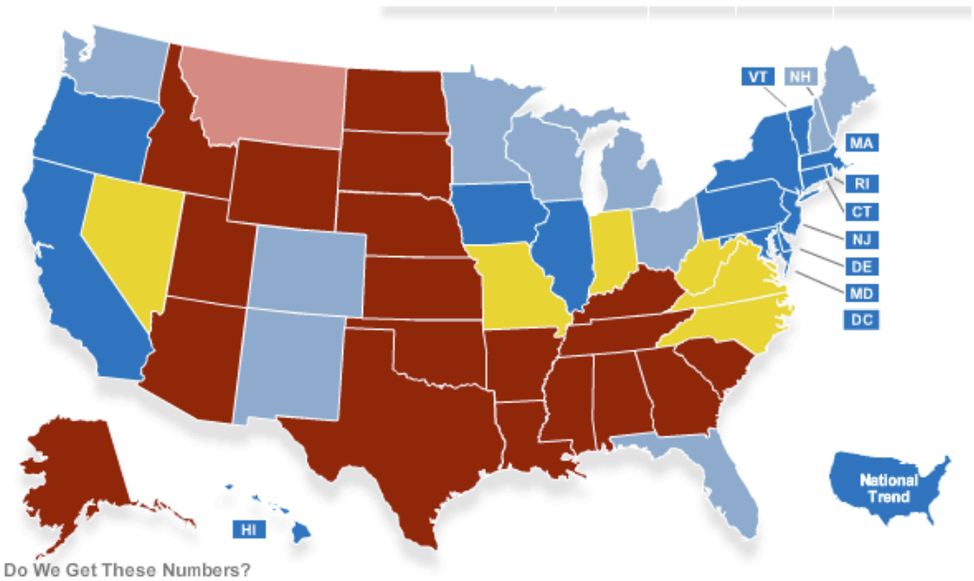
The 2008 U.S. Presidential Election

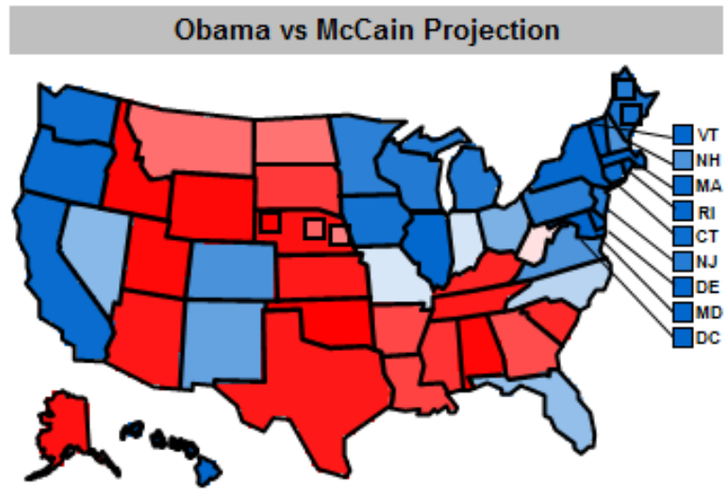
Physics 7682 / CIS 6229









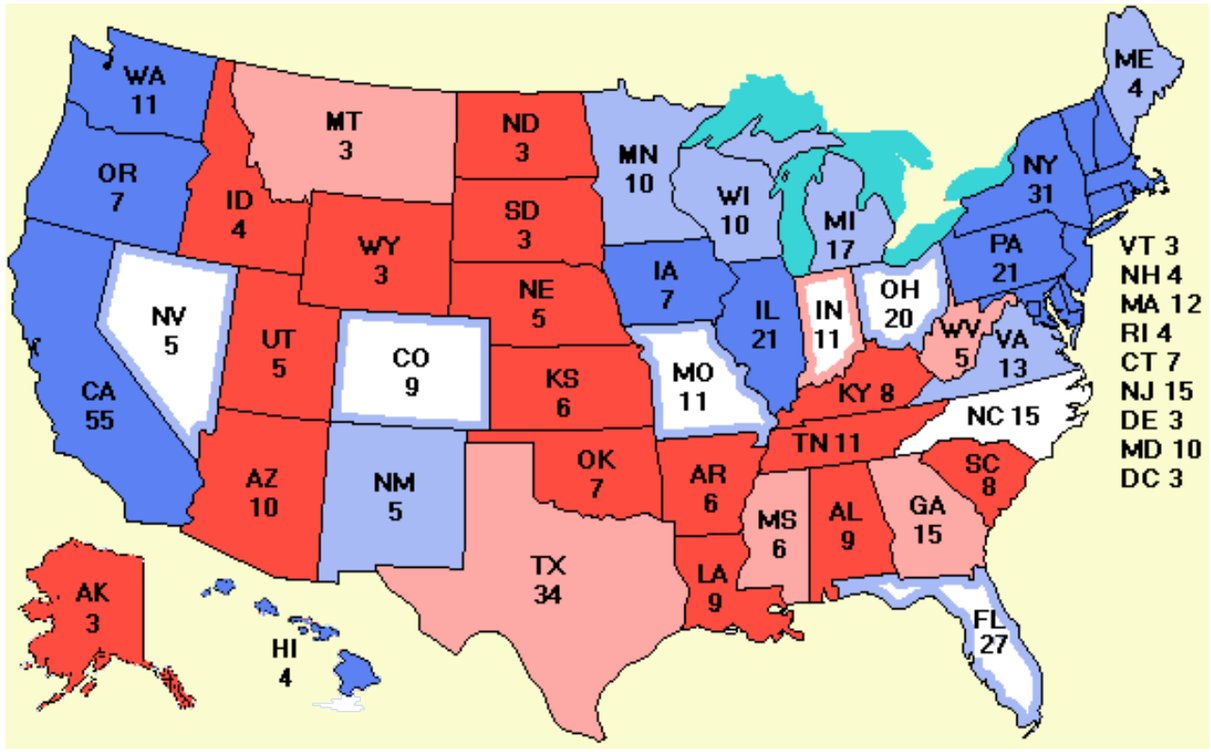


The 2008 U.S. Presidential Election

November 4, 2008

Deadline for NYS registration: TODAY (10/10/08)

Register at 128 E. Buffalo St., Ithaca, NY



Electoral college

- 538 electoral votes
- winner-take-all in each state (exc. for Nebraska and Maine)
- need 270 votes to win
- lots and lots of polls
- lots and lots of pundits

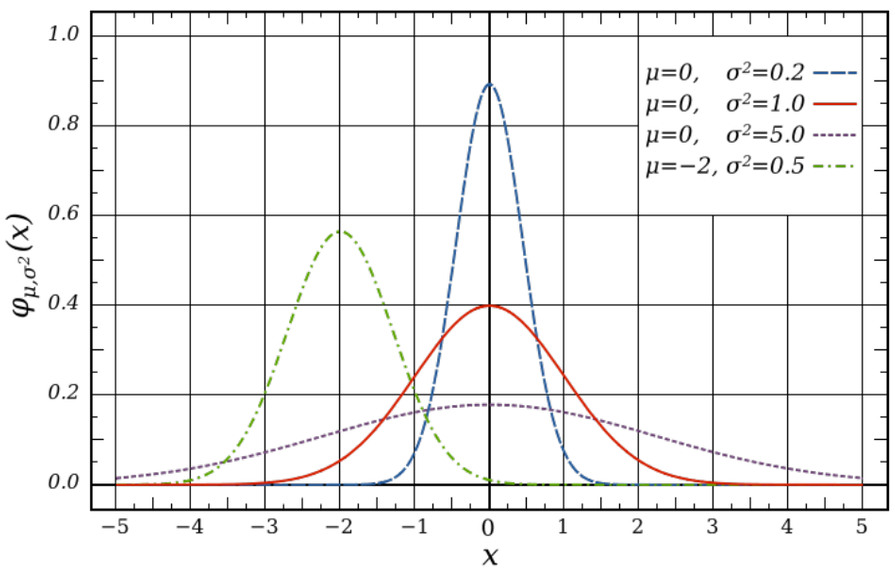
Analysis of polling data

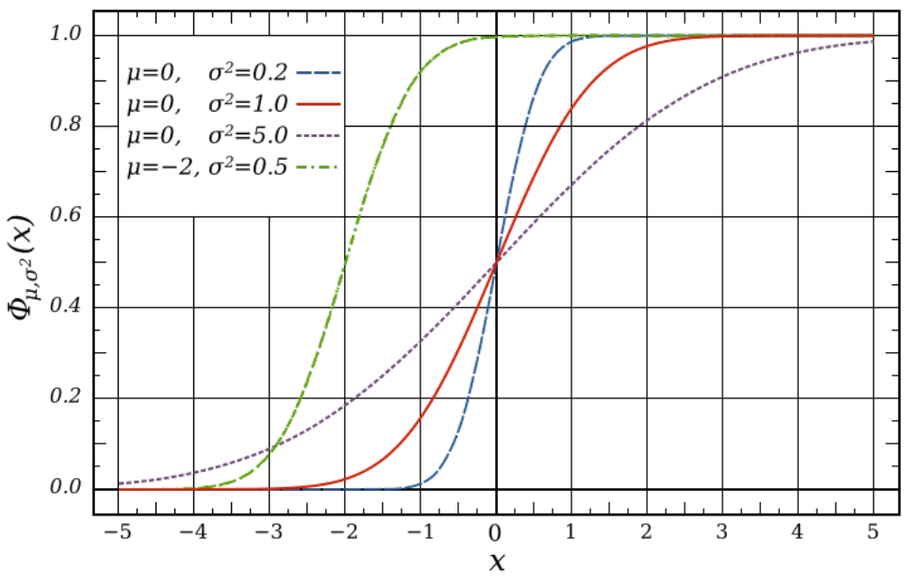
Use data from Princeton Election Consortium

- updated poll averages (processed from Pollster.com)
- use urllib.urlretrieve() to automatically download from the web
- write a simple parser to extract median poll margin (Obama-McCain) and margin of error

```
polls[date]={'AK':(-17.0, 2.0), 'AL':(-22.0, 2.0),...}
```

- assuming normal distribution, compute probability of each candidate winning each state





Wikipedia

Probability distribution of outcomes

- Via Monte Carlo
  - randomly sample from state-by-state probabilities to simulate many elections (2^{51} possible combinations)

- Via Exact Computation (no need for enumeration)
  - multiplication of polynomials ⇔ convolution of coefficients
  - e.g., consider 3 states (D win probabilities P1, P2, P3; EVs V1, V2, V3)

$$(P_1V_1 + \bar{P}_1)(P_2V_2 + \bar{P}_2)(P_3V_3 + \bar{P}_3) =$$
$$P_1P_2P_3V_1V_2V_3 + P_1P_2\bar{P}_3V_1V_2 + P_1\bar{P}_2P_3V_1V_3 + P_1\bar{P}_2\bar{P}_3V_1 +$$
$$\bar{P}_1P_2P_3V_2V_3 + \bar{P}_1P_2\bar{P}_3V_2 + \bar{P}_1\bar{P}_2P_3V_3 + \bar{P}_1P_2P_3$$

prob. of D having V1+V2+V3 votes = P1*P2*P3,
prob. of D having V1+V2 votes = P1*P2*(1-P3), etc.

convolution $w_k = \sum_j u_j v_{k-j}$