



A Tale of Two Houses: A Case Study in Heat Transfer

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Part I— Thanksgiving Dinner

You are in your first semester as an engineering student at the University of North Dakota and Thanksgiving is fast approaching. Despite having serious reservations, you decide to appease your mother and attend Thanksgiving dinner at the house of your Uncle Bill. The deciding factor in your decision is the fact that your other uncle, Bubba, from Atlanta will also be there. You haven't seen him in a few years and know that things are never dull when he is around.

As you arrive, you immediately find Bill and Bubba in a heated discussion. As it turns out, Bill has been complaining about how horrible his heating bills will be during the upcoming winter. Not to be outdone in the pity-generating department, Bubba claims that things are far worse in the South, where keeping his house cool in the summer requires much more energy.

Since you have always been known as the “smart one” in the family, Bill and Bubba naturally turn to you to settle their argument. Put your vast engineering knowledge to good use and help them settle their debate.

Uncle Bubba's House

Atlanta, GA
2,100 square feet, 3 bedroom, 2 bath
2 story, aluminum siding, poorly insulated
Built 1997, cedar deck, green asphalt shingles

Uncle Bill's House

Walhalla, ND
4,000 square feet, 4 bedroom, 3 bath
2 story with half-basement, wood siding
Built 1925, renovated 2005, well-insulated, 3 fireplaces

As Uncle Bubba and Uncle Bill continue to argue, you slip away to another (quieter) room. Pulling out a pad of paper, you begin to think about what factors will have an influence on how much energy is needed to heat or cool each house.

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