Buying a House:  
The Decision-Making Process  

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Decision Making in Engineering & Technology Management  
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Outline

- Introduction
- Methodology
- Assumptions
- Results & Discussion
- Recommendations
- Conclusions
Introduction

• Home-buying process
  – Largest & longest-term purchase many will make
  – Numerous steps, forms to fill-out, legal ramifications
  – Numerous factors to consider (tangible & emotional)
  – Conflicting criteria (e.g., price vs. location)
  – Often multiple decision makers (with differing priorities)
Methodology

• Use structured decision approach (AHP)
  1. Specify primary criteria
  2. Weight criteria via pairwise comparisons
  3. Select candidate homes
  4. Rank candidate homes
Methodology

• Method conducted twice:
  – “Test run” - buyers that have purchased homes
  – “Sample Couple” – buyers currently in the market for a home
Assumptions

- Finances already considered
- Criteria grouping reasonable/ preferentially independent criteria correctly identified
  - E.g., “Location” includes city, neighborhood, schools
- “Virtual” home visits
Results – Couple 1

• Five criteria
  – Price
  – Location
  – Floor plan
  – Square footage
  – Quality of construction/ Condition of home
<table>
<thead>
<tr>
<th>Price</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Square Footage</td>
<td>60</td>
</tr>
<tr>
<td>Floor Plan</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>Location</td>
<td>30</td>
</tr>
<tr>
<td>Price 70</td>
<td>Square Footage 30</td>
</tr>
<tr>
<td>Location 60</td>
<td>Floor Plan 40</td>
</tr>
<tr>
<td>Price 40</td>
<td>Quality of Const. 60</td>
</tr>
<tr>
<td>Location 70</td>
<td>Quality of Const. 30</td>
</tr>
<tr>
<td>Floor Plan 20</td>
<td>Quality of Const. 80</td>
</tr>
<tr>
<td>Square Footage 30</td>
<td>Quality of Const. 70</td>
</tr>
</tbody>
</table>
Results – Couple 1

• Priority Weights
  – Price = 0.18
  – Location = 0.31
  – Floor plan = 0.12
  – Square footage = 0.12
  – Quality of const. = 0.27

• Inconsistency = 0.11 – Too high?
Results – Couple 1

• Priority Weights – “Team”
  – Price = 0.18
  – Location = 0.31
  – Floor plan = 0.12
  – Square footage = 0.12
  – Quality of const. = 0.27
• Inconsistency = 0.11

• Priority Weights – “Individual”
  – Price = 0.19
  – Location = 0.34
  – Floor plan = 0.11
  – Square footage = 0.10
  – Quality of const. = 0.26
• Inconsistency = 0.10
## Results – Couple 1

### Candidate Homes for Couple 1

#### 1. PORTLAND

<table>
<thead>
<tr>
<th>ML:</th>
<th>City: PORTLAND</th>
<th>Status: ACT</th>
<th>Price: $155,900</th>
<th>Sqft: 1336</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds: 3</td>
<td>Baths: 2.0</td>
<td>YrBuilt: 1997</td>
<td>Tax/Yr: $2,125</td>
<td>Nhood: SPRINGWATER HIGHLAND</td>
</tr>
</tbody>
</table>

BEAUTIFUL, CONTEMPORARY RANCH HOME, FULLY LANDSCAPE WITH TILE PATIO, VAULTED CEILING THROUGHOUT, IMMACULATE INSIDE AND OUT, LOCATED ON PEACEFUL CUL-DE-SAC. ADDRESS: 5841 SE 133 PL & RAMONA. CALL RICH 503.267.3105

#### 2. ALOHA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds: 3</td>
<td>Baths: 2.0</td>
<td>YrBuilt: 1996</td>
<td>Tax/Yr: $1,817</td>
<td></td>
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</table>

3BDRM/2BTH PRACTICALLY NEW W/1590 SQ FT. LG. FNCD LOT.NEW CARPET/ PERGO FLRS IN KIT/DNG RMS,TILE ENTRY/KITCHEN MUST SEE.FOR PERSONAL SHOWING CALL KURT @ 503-803-1033. AGENTS CALL TRENT AT 503-628-1517

#### 3. HILLSBORO

<table>
<thead>
<tr>
<th>ML:</th>
<th>City: HILLSBORO</th>
<th>Status: ACT</th>
<th>Price: $152,500</th>
<th>Sqft: 1305</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds: 3</td>
<td>Baths: 2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CALL 503-628-1517 FOR PERSONAL SHOWING.
Calculations:

Weights

\[
\begin{bmatrix} W_P, W_L, W_F, W_S, W_Q \end{bmatrix} \times
\begin{bmatrix}
A_{P1} & A_{P2} & \cdots & A_{P5} \\
A_{L1} & A_{L2} & \cdots & A_{L5} \\
\vdots & \vdots & \ddots & \vdots \\
A_{Q1} & A_{Q2} & \cdots & A_{Q5}
\end{bmatrix}
\]

\[
= \begin{bmatrix} V_1, V_2, \cdots, V_5 \end{bmatrix}
\]

Portland, Aloha, … Beaverton
Results – Couple 1

<table>
<thead>
<tr>
<th>Home Purchase Decision Matrix</th>
<th>Alternative Homes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portland</td>
<td>Aloha</td>
</tr>
<tr>
<td>Price</td>
<td>0.21</td>
<td>0.05</td>
</tr>
<tr>
<td>Location</td>
<td>0.24</td>
<td>0.09</td>
</tr>
<tr>
<td>Floor plan</td>
<td>0.28</td>
<td>0.25</td>
</tr>
<tr>
<td>Square footage</td>
<td>0.14</td>
<td>0.42</td>
</tr>
<tr>
<td>Quality of construction/Condition</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Value</td>
<td>0.24</td>
<td>0.20</td>
</tr>
<tr>
<td>Rank</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Results – Couple 1

- Couple felt results agreed well with their perceptions – with the exception of the Tigard home (0.11), all homes were about equal (0.20-0.24), though they leaned towards the Portland home
Results – Couple 2

• Five criteria
  – Price
  – Location
  – Floor plan
  – Square footage
  – Year built
Results – Couple 2

• Priority Weights
  – Price = 0.30
  – Location = 0.12
  – Floor plan = 0.21
  – Square footage = 0.28
  – Year built = 0.09

• Inconsistency = 0.03
Results – Couple 2

Couple 1
- Priority Weights
  - Price = 0.18
  - Location = 0.31
  - Floor plan = 0.12
  - Square footage = 0.12
  - Quality of const. = 0.27
- Inconsistency = 0.11

Couple 2
- Priority Weights
  - Price = 0.30
  - Location = 0.12
  - Floor plan = 0.21
  - Square footage = 0.28
  - Year built = 0.09
- Inconsistency = 0.03
## Results – Couple 2

<table>
<thead>
<tr>
<th></th>
<th>Alternative Homes (MLS #)</th>
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<th></th>
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<tbody>
<tr>
<td></td>
<td>287581</td>
<td>291133</td>
<td>295418</td>
<td>297981</td>
<td>299417</td>
</tr>
<tr>
<td>Price</td>
<td>0.14</td>
<td>0.26</td>
<td>0.07</td>
<td>0.13</td>
<td>0.40</td>
</tr>
<tr>
<td>Location</td>
<td>0.17</td>
<td>0.30</td>
<td>0.13</td>
<td>0.19</td>
<td>0.20</td>
</tr>
<tr>
<td>Floor plan</td>
<td>0.14</td>
<td>0.26</td>
<td>0.07</td>
<td>0.13</td>
<td>0.40</td>
</tr>
<tr>
<td>Square footage</td>
<td>0.11</td>
<td>0.30</td>
<td>0.09</td>
<td>0.14</td>
<td>0.36</td>
</tr>
<tr>
<td>Year built</td>
<td>0.19</td>
<td>0.16</td>
<td>0.16</td>
<td>0.10</td>
<td>0.39</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td><strong>0.14</strong></td>
<td><strong>0.27</strong></td>
<td><strong>0.09</strong></td>
<td><strong>0.14</strong></td>
<td><strong>0.36</strong></td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>5</strong></td>
<td><strong>4</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>
Results – Couple 2

• Couple also satisfied with results – Home 5 was their clear favorite
• Couple is planning to visit the 5 homes
Recommendations

- Couple 2 to visit 5 homes and perform pairwise comparison on homes again
- Consider more than 5 criteria; eliminate very low value criteria
- Consider more than 5 homes; visit only top 3-5
- Make purchase offers following home ranking (offer on #1, counter-offer, etc. then go to home #2)
Conclusions

• Process as important as outcome
  – Less time spent visiting non-viable homes
  – Better understanding of partner’s priorities (or realtor understands you better)
  – More confidence in decision
Questions?