

Data Normalization

Team Members :-

Aakash Rajawat- 002764127

Diya Baldota- 002747966

Hardik Sodhani- 002770306

Rucha Chotalia- 002711888

Table: Housing Data

The housing data was not in 1NF as it had multiple data in single column

Solution: Data was normalized using python script to bring in 1NF form

https://colab.research.google.com/drive/1CiiHFNYM0Xm1kVO_wpWN4JUUI3zaz7#scrollTo=wYWrxajRF3yD

Data:-

Before Normalizing

| | A | B | C | D | E | F |
|------|------------|---|------------------------|------|-----------|---|
| 3536 | 7050927500 | https://worchester.craigslist.org/apa/d/bellingham-the-charles-bellingham-in/7050927500.html | worcester / central MA | 1769 | apartment | |
| 3537 | 7050927311 | https://worchester.craigslist.org/apa/d/ashland-wonderful-2bedroom-nice-and/7050927311.html | worcester / central MA | 1350 | house | |
| 3538 | 7048988994 | https://worchester.craigslist.org/apa/d/westborough-private-balcony-rec-room/7048988994.html | worcester / central MA | 1630 | apartment | |
| 3539 | 7040054504 | https://worchester.craigslist.org/apa/d/worcester-15-forkey-ave-3-bd-2-ba-for/7040054504.html | worcester / central MA | 850 | apartment | |
| 3540 | 7040048768 | https://worchester.craigslist.org/apa/d/worcester-7-creswell-rd-2-bd-2-ba-for/7040048768.html | worcester / central MA | 800 | apartment | |
| 3541 | 7034478068 | https://worchester.craigslist.org/apa/d/worcester-1-walter-st-3-bd-2-ba-for/7034478068.html | worcester / central MA | 900 | apartment | |
| 3542 | 7034475049 | https://worchester.craigslist.org/apa/d/worcester-19-passway-3-2-bd-1-ba-for/7034475049.html | worcester / central MA | 750 | apartment | |
| 3543 | 7045031423 | https://worchester.craigslist.org/apa/d/auburn-auburn-beautiful-includes/7045031423.html | worcester / central MA | 1000 | house | |
| 3544 | 7041334168 | https://worchester.craigslist.org/apa/d/bellingham-apartments-available-in/7041334168.html | worcester / central MA | 1935 | apartment | |
| 3545 | 7048603216 | https://worchester.craigslist.org/apa/d/grafon-housing-available-for-immediate/7048603216.htm | worcester / central MA | 1300 | apartment | |
| 3546 | 7048600678 | https://worchester.craigslist.org/apa/d/boylston-great-place-available-today/7048600678.html | worcester / central MA | 1100 | townhouse | |
| 3547 | 7050712040 | https://worchester.craigslist.org/apa/d/worcester-spacey-super-345-bed-room/7050712040.html | worcester / central MA | 640 | house | |
| 3548 | 7050871054 | https://worchester.craigslist.org/apa/d/worcester-leasing-now-hair-salon-elder/7050871054.html | worcester / central MA | 1500 | apartment | |
| 3549 | 7050863243 | https://worchester.craigslist.org/apa/d/bellingham-apartments-in-bellingham-24/7050863243.htm | worcester / central MA | 1979 | apartment | |
| 3550 | 7050798045 | https://worchester.craigslist.org/apa/d/worcester-wonderful-apartment-for-rent/7050798045.htm | worcester / central MA | 1680 | apartment | |
| 3551 | 7050797641 | https://worchester.craigslist.org/apa/d/worcester-2-bedrooms-2-bathrooms-pet/7050797641.htm | worcester / central MA | 1245 | apartment | |
| 3552 | 7048300281 | https://worchester.craigslist.org/apa/d/maynard-move-in-special-in-unit-washer/7048300281.htm | worcester / central MA | 3019 | apartment | |
| 3553 | 7050853060 | https://worchester.craigslist.org/apa/d/maynard-ask-about-our-move-in-special/7050853060.htm | worcester / central MA | 2369 | apartment | |
| 3554 | 7050842602 | https://worchester.craigslist.org/apa/d/marlborough-rt-20-huge-modern-2-bed/7050842602.html | worcester / central MA | 1475 | apartment | |
| 3555 | 7050842533 | https://worchester.craigslist.org/apa/d/marlborough-rt-20-huge-modern-2-bed/7050842533.html | worcester / central MA | 1475 | apartment | |
| 3556 | 7050838203 | https://worchester.craigslist.org/apa/d/shrewsbury-immediate-move-in-2-br/7050838203.html | worcester / central MA | 1556 | apartment | |
| 3557 | 7035042700 | https://worchester.craigslist.org/apa/d/worcester-46-wrentham-rd-bd-2-ba-for/7035042700.html | worcester / central MA | 900 | apartment | |
| 3558 | 7035044443 | https://worchester.craigslist.org/apa/d/worcester-amazing-view-clara-st-3-bd-2/7035044443.html | worcester / central MA | 1000 | apartment | |
| 3559 | 7048297852 | https://worchester.craigslist.org/apa/d/bellingham-your-new-apartment-home-in/7048297852.htm | worcester / central MA | 1940 | apartment | |

After Normalizing in 1NF :-

| | id | url | region | price | type | city | state |
|------|------------|--|------------------------|-------|-----------|-------------|------------|
| 0 | 7048591916 | https://boston.craigslist.org/gbs/apa/d/waverl... | boston | 2450 | apartment | boston | None |
| 1 | 7048584795 | https://boston.craigslist.org/bmw/apa/d/concor... | boston | 1747 | apartment | boston | None |
| 2 | 7048579724 | https://boston.craigslist.org/bmw/apa/d/concor... | boston | 1667 | apartment | boston | None |
| 3 | 7038629072 | https://boston.craigslist.org/sob/apa/d/stough... | boston | 2400 | condo | boston | None |
| 4 | 7039656604 | https://southcoast.craigslist.org/apa/d/allsto... | south coast | 2350 | apartment | south coast | None |
| ... | ... | ... | ... | ... | ... | ... | ... |
| 4921 | 7024971933 | https://worchester.craigslist.org/apa/d/fitchbu... | worcester / central MA | 1480 | apartment | worcester | central MA |
| 4922 | 7024959372 | https://worchester.craigslist.org/apa/d/hudson-... | worcester / central MA | 2155 | apartment | worcester | central MA |
| 4923 | 7024940732 | https://worchester.craigslist.org/apa/d/worcest... | worcester / central MA | 1550 | apartment | worcester | central MA |
| 4924 | 7024932794 | https://worchester.craigslist.org/apa/d/worcest... | worcester / central MA | 1810 | apartment | worcester | central MA |
| 4925 | 7024928221 | https://worchester.craigslist.org/apa/d/berlin-... | worcester / central MA | 1 | apartment | worcester | central MA |

3rd Normal Form:

- For the table to be in 3rd Normal Form, it must satisfy the conditions of 1st Normal Form and 2nd Normal Form.
- The table is now satisfying the 2nd Normal Form.
- There are no partial and transitive dependencies in the table. So the table is now in 3rd Normal Form.

| | A | B | C | D | E | F | G | H |
|----|-------------------|---|------------------------|-------|-----------|-----------------------|------------|---|
| | Split Table-Final | | | | | | | |
| 1 | id | url | region | price | type | city | state | |
| 2 | 0 | 7048591916 https://boston.craigslist.org/gbs/apa/d/waverley-lexington-center-battlegreen/7048591916.html | boston | 2450 | apartment | boston | | |
| 3 | 1 | 7048584795 https://boston.craigslist.org/bmw/apa/d/concord-amazing-2bed-affordable-housing/7048584795.html | boston | 1747 | apartment | boston | | |
| 4 | 2 | 7048579724 https://boston.craigslist.org/bmw/apa/d/concord-incredible-opportunity/7048579724.html | boston | 1667 | apartment | boston | | |
| 5 | 3 | 7038629072 https://boston.craigslist.org/sob/apa/d/stoughton-great-modern-3-br-apartment/7038629072.html | boston | 2400 | condo | boston | | |
| 6 | 4 | 7039656604 https://southcoast.craigslist.org/apa/d/allston-bu-west-beautiful-heated-2-bed/7039656604.html | south coast | 2350 | apartment | south coast | | |
| 7 | 5 | 7041351743 https://boston.craigslist.org/gbs/apa/d/revere-revere-beach/7041351743.html | boston | 2400 | apartment | boston | | |
| 8 | 6 | 7039980403 https://boston.craigslist.org/sob/apa/d/onset-wareham-off-season-home-for-rent/7039980403.html | boston | 2500 | house | boston | | |
| 9 | 7 | 7038626569 https://boston.craigslist.org/bmw/apa/d/aurumdale-upper-floor-corner-modern/7038626569.html | boston | 1950 | apartment | boston | | |
| 10 | 8 | 7038476783 https://boston.craigslist.org/sob/apa/d/brainree-2-bed-2-bath-attached-garage/7038476783.html | boston | 2733 | apartment | boston | | |
| 11 | 9 | 7048764784 https://westernmass.craigslist.org/apa/d/indian-orchard-385-water-street/7048764784.html | western massachusetts | 980 | duplex | western massachusetts | | |
| 12 | 10 | 7045762382 https://westernmass.craigslist.org/apa/d/south-deerfield-large-2-story-colonial/7045762382.html | western massachusetts | 2300 | house | western massachusetts | | |
| 13 | 11 | 7045658928 https://westernmass.craigslist.org/apa/d/pittsfield-awesome-furnished-house-many/7045658928.html | western massachusetts | 620 | house | western massachusetts | | |
| 14 | 12 | 7039651801 https://boston.craigslist.org/nwb/apa/d/methuen-new-3-bedroom-2-bathroom-house/7039651801.html | boston | 1950 | house | boston | | |
| 15 | 13 | 7043596449 https://westernmass.craigslist.org/apa/d/russell-4-bedroom-2-bth-super-updated/7043596449.html | western massachusetts | 1185 | condo | western massachusetts | | |
| 16 | 14 | 7037265704 https://worchester.craigslist.org/apa/d/clinton-so-much-charm/7037265704.html | worcester / central MA | 1875 | apartment | worcester | central MA | |
| 17 | 15 | 7047458481 https://boston.craigslist.org/bmw/apa/d/lincoln-private-quiet-bright-all/7047458481.html | boston | 1700 | apartment | boston | | |
| 18 | 16 | 7047437876 https://boston.craigslist.org/nwb/apa/d/chelmsford-chelmsfords-best-pet/7047437876.html | boston | 1740 | apartment | boston | | |
| 19 | 17 | 7048528876 https://boston.craigslist.org/gbs/apa/d/medford-house-for-rent-br-2ba/7048528876.html | boston | 2987 | apartment | boston | | |
| 20 | 18 | 7047404484 https://boston.craigslist.org/gbs/apa/d/chelsea-2-miles-from-boston-luxury/7047404484.html | boston | 1821 | apartment | boston | | |
| 21 | 19 | 7048429286 https://boston.craigslist.org/sob/apa/d/pembroke-inlaw-apartment/7048429286.html | boston | 1500 | apartment | boston | | |
| 22 | 20 | 7025762290 https://worchester.craigslist.org/apa/d/westborough-charming-2br-in-updated/7025762290.html | worcester / central MA | 1850 | apartment | worcester | central MA | |
| 23 | 21 | 7049615002 https://worchester.craigslist.org/apa/d/leominster-open-house-today-from-noon/7049615002.html | worcester / central MA | 700 | apartment | worcester | central MA | |
| 24 | 22 | 7041062421 https://boston.craigslist.org/sob/apa/d/east-walpole-east-walpole-2-bedroom/7041062421.html | boston | 1500 | apartment | boston | | |
| 25 | 23 | 7039764978 https://westernmass.craigslist.org/apa/d/adams-one-bedroom-near-downtown-adams/7039764978.html | western massachusetts | 550 | apartment | western massachusetts | | |
| 26 | 24 | 7049345178 https://worchester.craigslist.org/apa/d/south-barre-3-bedroom-15bth-private-and/7049345178.html | worcester / central MA | 1190 | house | worcester | central MA | |
| 27 | 25 | 7049364460 https://worchester.craigslist.org/apa/d/clinton-style-and-comfort-awaits-you-at/7049364460.html | worcester / central MA | 1925 | apartment | worcester | central MA | |
| 28 | 26 | 7049680166 https://boston.craigslist.org/sob/apa/d/taunton-renovated-1-bed-apartment/7049680166.html | boston | 1275 | apartment | boston | | |
| 29 | 27 | 7049677928 https://boston.craigslist.org/sob/apa/d/taunton-newly-constructed-2-bed/7049677928.html | boston | 1625 | apartment | boston | | |
| 30 | 28 | 7049675808 https://boston.craigslist.org/nwb/apa/d/newburyport-half-house-for-rent/7049675808.html | boston | 1950 | house | boston | | |
| 31 | 29 | 7049675223 https://boston.craigslist.org/sob/apa/d/taunton-newly-constructed-1-bed/7049675223.html | boston | 1475 | apartment | boston | | |
| 32 | 30 | 7049673607 https://boston.craigslist.org/bmw/apa/d/worcester-renovated-2-bedroom-worcester/7049673607.html | boston | 1375 | apartment | boston | | |
| 33 | 31 | 7049671418 https://boston.craigslist.org/bmw/apa/d/worcester-large-1-bedroom-apartment/7049671418.html | boston | 1225 | apartment | boston | | |
| 34 | 32 | 7049669480 https://boston.craigslist.org/bmw/apa/d/worcester-1-bedroom-apartment-worcester/7049669480.html | boston | 1100 | apartment | boston | | |
| 35 | 33 | 7047403742 https://boston.craigslist.org/bmw/apa/d/lowell-newly-renovated-1-bedroom/7047403742.html | boston | 1200 | apartment | boston | | |
| 36 | 34 | 7049667953 https://boston.craigslist.org/nos/apa/d/rockport-2-bedroom-apartment-rockport/7049667953.html | boston | 1595 | apartment | boston | | |
| 37 | 35 | 7049666826 https://boston.craigslist.org/nos/apa/d/rockport-rockport-1-bedroom-special/7049666826.html | boston | 1395 | apartment | boston | | |

2nd Normal Form:

- For the table to be in 2nd Normal Form, it must satisfy the conditions of 1st Normal Form.
- The table has now been converted into 2nd Normal Form
- This table does not contain partial dependency.

As this table, fulfils all the above criteria, it is said to be in 2nd Normal Form.

| id | url | region | price | type | city | state |
|----|---|------------------------|-------|-----------|-----------------------|------------|
| 0 | https://boston.craigslist.org/gbs/apa/d/waverley-lexington-center-battlegreen/7048591916.html | boston | 2450 | apartment | boston | |
| 1 | https://boston.craigslist.org/bmw/apa/d/concord-amazing-2bed-affordable-housing/7048584795.html | boston | 1747 | apartment | boston | |
| 2 | https://boston.craigslist.org/bmw/apa/d/concord-incredible-opportunity/7048579724.html | boston | 1667 | apartment | boston | |
| 3 | https://boston.craigslist.org/sob/apa/d/stoughton-great-modern-3-br-apartment/7038629072.html | boston | 2400 | condo | boston | |
| 4 | https://southcoast.craigslist.org/apa/d/dallston-bu-west-beautiful-heated-2-bed/7039656604.html | south coast | 2350 | apartment | south coast | |
| 5 | https://boston.craigslist.org/gbs/apa/d/revere-revere-beach/7041351743.html | boston | 2400 | apartment | boston | |
| 6 | https://boston.craigslist.org/sob/apa/d/onset-wareham-off-season-home-for-rent/7039980403.html | boston | 2500 | house | boston | |
| 7 | https://boston.craigslist.org/bmw/apa/d/auburndale-upper-floor-corer-modern/7038626569.html | boston | 1950 | apartment | boston | |
| 8 | https://boston.craigslist.org/sob/apa/d/braintree-2-bed-2-bath-attached-garage/7038476783.html | boston | 2733 | apartment | boston | |
| 9 | https://westernmass.craigslist.org/apa/d/indian-orchard-385-water-street/7048764784.html | western massachusetts | 980 | duplex | western massachusetts | |
| 10 | https://westernmass.craigslist.org/apa/d/south-deerfield-large-2-story-colonial/7045762382.html | western massachusetts | 2300 | house | western massachusetts | |
| 11 | https://westernmass.craigslist.org/apa/d/pittsfield-awesome-furnished-house-many/7045658928.html | western massachusetts | 620 | house | western massachusetts | |
| 12 | https://boston.craigslist.org/nwb/apa/d/methuen-new-3-bedroom-2-bathroom-house/7039651801.html | boston | 1950 | house | boston | |
| 13 | https://westernmass.craigslist.org/apa/d/russell-4-bedroom-2-bth-super-updated/7043596449.html | western massachusetts | 1185 | condo | western massachusetts | |
| 14 | https://worchester.craigslist.org/apa/d/clinton-so-much-charm/7037265704.html | worcester / central MA | 1875 | apartment | worcester | central MA |
| 15 | https://boston.craigslist.org/bmw/apa/d/lincoln-private-quiet-bright-all/7047458481.html | boston | 1700 | apartment | boston | |
| 16 | https://boston.craigslist.org/nwb/apa/d/chelmsford-chelmsfords-best-pet/7047437876.html | boston | 1740 | apartment | boston | |
| 17 | https://boston.craigslist.org/gbs/apa/d/medford-house-for-rent-br-2ba/7048528876.html | boston | 2987 | apartment | boston | |
| 18 | https://boston.craigslist.org/gbs/apa/d/chelsea-2-miles-from-boston-luxury/7047404484.html | boston | 1821 | apartment | boston | |
| 19 | https://boston.craigslist.org/sob/apa/d/pembroke-inlaw-apartment/7048429286.html | boston | 1500 | apartment | boston | |
| 20 | https://worchester.craigslist.org/apa/d/westborough-charming-2br-in-updated/7025762290.html | worcester / central MA | 1850 | apartment | worcester | central MA |
| 21 | https://worchester.craigslist.org/apa/d/leominster-open-house-today-from-noon/7049615002.html | worcester / central MA | 700 | apartment | worcester | central MA |
| 22 | https://boston.craigslist.org/sob/apa/d/east-walpole-east-walpole-2-bedroom/7041062421.html | boston | 1500 | apartment | boston | |
| 23 | https://westernmass.craigslist.org/apa/d/adams-one-bedroom-near-downtown-adams/7039764978.html | western massachusetts | 550 | apartment | western massachusetts | |
| 24 | https://worchester.craigslist.org/apa/d/south-barre-3-bedroom-15bth-private-and/7049345178.html | worcester / central MA | 1190 | house | worcester | central MA |
| 25 | https://worchester.craigslist.org/apa/d/clinton-style-and-comfort-awaits-you-at/7049364460.html | worcester / central MA | 1925 | apartment | worcester | central MA |
| 26 | https://boston.craigslist.org/sob/apa/d/taunton-renovated-1-bed-apartment/7049680166.html | boston | 1275 | apartment | boston | |
| 27 | https://boston.craigslist.org/sob/apa/d/taunton-newly-constructed-2-bed/7049677928.html | boston | 1625 | apartment | boston | |
| 28 | https://boston.craigslist.org/nwb/apa/d/newburyport-half-house-for-rent/7049675808.html | boston | 1950 | house | boston | |
| 29 | https://boston.craigslist.org/sob/apa/d/taunton-newly-constructed-1-bed/7049675223.html | boston | 1475 | apartment | boston | |
| 30 | https://boston.craigslist.org/bmw/apa/d/worcester-renovated-2-bedroom-worcester/7049673607.html | boston | 1375 | apartment | boston | |
| 31 | https://boston.craigslist.org/bmw/apa/d/worcester-large-1-bedroom-apartment/7049671418.html | boston | 1225 | apartment | boston | |
| 32 | https://boston.craigslist.org/bmw/apa/d/worcester-1-bedroom-apartment-worcester/7049669480.html | boston | 1100 | apartment | boston | |
| 33 | https://boston.craigslist.org/bmw/apa/d/iowell-newly-renovated-1-bedroom/7047403742.html | boston | 1200 | apartment | boston | |
| 34 | https://boston.craigslist.org/nos/apa/d/rockport-2-bedroom-apartment-rockport/7049667953.html | boston | 1595 | apartment | boston | |
| 35 | https://boston.craigslist.org/nos/apa/d/rockport-rockport-1-bedroom-special/7049666826.html | boston | 1395 | apartment | boston | |

VIEW SQL queries:

1. CREATE VIEW beds AS(

```
SELECT dmddapt1.id, dmddapt2.beds, dmddapt2.sqfeet FROM dmddapt1 INNER JOIN dmddapt2 ON  
dmddapt1.id=dmddapt2.id);
```

2. CREATE VIEW laundry AS(

```
SELECT dmddapt1.id, dmddapt2.beds, dmddapt2.laundry_options FROM dmddapt1 LEFT JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id);
```

3. CREATE VIEW region AS(

```
SELECT dmddapt1.id, dmddapt2.region, dmddapt2.sqfeet FROM dmddapt2 RIGHT JOIN dmddapt1 ON  
dmddapt1.id=dmddapt2.id) ;
```

4. CREATE VIEW sqfeet AS(

```
SELECT dmddapt1.id, dmddapt2.region, dmddapt2.sqfeet FROM dmddapt2 INNER JOIN dmddapt1 ON  
dmddapt1.id=dmddapt2.id ORDER BY dmddapt2.sqfeet DESC);
```

5. CREATE VIEW area AS(

```
SELECT dmddapt1.type, dmddapt2.sqfeet FROM dmddapt2 INNER JOIN dmddapt1 ON  
dmddapt1.id=dmddapt2.id) ;
```

6. CREATE VIEW price AS(

```
SELECT AVG(dmddapt1.price) FROM dmddapt2 INNER JOIN dmddapt1 ON dmddapt1.id=dmddapt2.id) ;
```

7. CREATE VIEW state AS(

```
SELECT state, count(image_url) as count FROM dmddapt4 GROUP BY state);
```

8. CREATE VIEW id AS(

```
SELECT COUNT(id) as count, region FROM dmddapt2 GROUP BY region);
```

9. CREATE VIEW carpet AS(

```
SELECT dmddapt1.id, dmddapt2.beds, dmddapt2.sqfeet FROM dmddapt1 INNER JOIN dmddapt2 ON  
dmddapt1.id=dmddapt2.id where dmddapt2.laundry_options like '%laundry in bldg%' or  
dmddapt2.laundry_options like '%laundry on site%');
```

10. CREATE VIEW bhk AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt1.type, dmddapt2.region FROM dmddapt1 INNER JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id where dmddapt2.region = 'Boston' and dmddapt1.type like  
'%apartment%');
```

11. CREATE VIEW apperance AS(

```
SELECT dmddapt1.id, dmddapt2.region, dmddapt2.sqfeet FROM dmddapt2 RIGHT JOIN dmddapt1 ON  
dmddapt1.id=dmddapt2.id) ;
```

12. CREATE VIEW apartment AS(

```
SELECT * FROM dmddapt1 JOIN dmddapt4 ON dmddapt1.id=dmddapt4.id where dmddapt1.type =  
'apartment' and dmddapt4.image_url IS NOT NULL);
```

13. CREATE VIEW boston AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt1.type, dmddapt2.region FROM dmddapt1 JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id where dmddapt2.region = 'Boston' and dmddapt1.type like  
'%apartment%');
```

14. CREATE VIEW morethanprice AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt2.region FROM dmddapt1 JOIN dmddapt2 ON  
dmddapt1.id=dmddapt2.id where dmddapt2.sqfeet > 700 and dmddapt1.type like '%apartment%'  
ORDER BY dmddapt1.price DESC);
```

15. CREATE VIEW unit AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt2.beds, dmddapt2.laundry_options FROM dmddapt1  
JOIN dmddapt2 ON dmddapt1.id=dmddapt2.id where dmddapt2.laundry_options='w/d in unit');
```

16. CREATE VIEW bedsthan AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt2.beds,dmddapt2.beds FROM dmddapt1 JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id where dmddapt2.beds>1);
```

17. CREATE VIEW regioning AS(

```
SELECT DISTINCT dmddapt2.region, dmddapt2.sqfeet FROM dmddapt2 RIGHT JOIN dmddapt1 ON  
dmddapt1.id=dmddapt2.id) ;
```

18. CREATE VIEW petting AS(

```
SELECT dmddapt1.id, dmddapt3.cats_allowed, dmddapt3.cats_allowed FROM dmddapt3 RIGHT JOIN  
dmddapt1 ON dmddapt1.id=dmddapt3.id );
```

19. CREATE VIEW bedss AS(

```
SELECT dmddapt1.id, dmddapt1.price, dmddapt2.beds,dmddapt2.beds FROM dmddapt1 JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id where dmddapt2.beds>1);
```

20. CREATE VIEW idssss AS(

```
SELECT dmddapt1.id, dmddapt2.beds, dmddapt2.laundry_options FROM dmddapt1 LEFT JOIN  
dmddapt2 ON dmddapt1.id=dmddapt2.id);
```

ER diagram:

