Certification Program on Business Analytics

Assignment No:3

Date: 25th Feb to 03rd March-2018

Submitted By:
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Topics

1. Read and Understand the Three Papers/articles titled

   (i) Bayes' Theorem in the 21st Century
   (ii) BayesMarketing
   (iii) The use of Bayes and causal modelling in decision making, uncertainty and risk

   Make a brief Summary on the main theme of each paper.

2. Submit the Hands-on Session Assignment of your groups final version (The respective group members can discuss over mail and finalize it)

3. Solve and submit the following 20 problems from the book "Complete Business Statistics" by Aczel…… Chapter – 2

Bayes' Theorem in the 21st Century

1. Practical methods for making inferences from data using probability models for quantities we observe and about which we wish to learn
2. A Bayesian model is described by parameters, uncertainty in those parameters is described using probability distributions.
3. All conclusions from Bayesian statistical procedures are stated in terms of *probability statements*

$$P(B/A) = P(A/B)P(B) / P(A)$$

P(B/A): Posterior probability

P(B) : Prior probability

P(A/B): Likelihood of observations

P(A) : Normalising constant

This confers several benefits to the analyst, including:

A. ease of interpretation, summarisation of uncertainty
B. can incorporate uncertainty in parent parameters
C. easy to calculate summary statistics

Bayes' Theorem in the 21st Century

Why be Bayesian?

We already noted that there is just one estimator in Bayesian inference, which lends to its ***simplicity***. Moreover, Bayes affords a conceptually simple way of coping with multiple parameters; the use of probabilistic models allows very complex models to be assembled in a modular fashion, by factoring a large joint model into the product of several conditional probabilities.

Bayesian statistics is also attractive for its ***coherence***. All unknown quantities for a particular problem are treated as random variables, to be estimated in the same way. Existing knowledge is given precise mathematical expression, allowing it to be integrated with information from the study dataset, and there is formal mechanism for incorporating new information into an existing analysis.

Finally, Bayesian statistics confers an advantage in the ***interpretability*** of analytic outputs. Because models are expressed probabilistically, results can be interpreted probabilistically. Probabilities are easy for users (particularly non-technical users) to understand and apply.

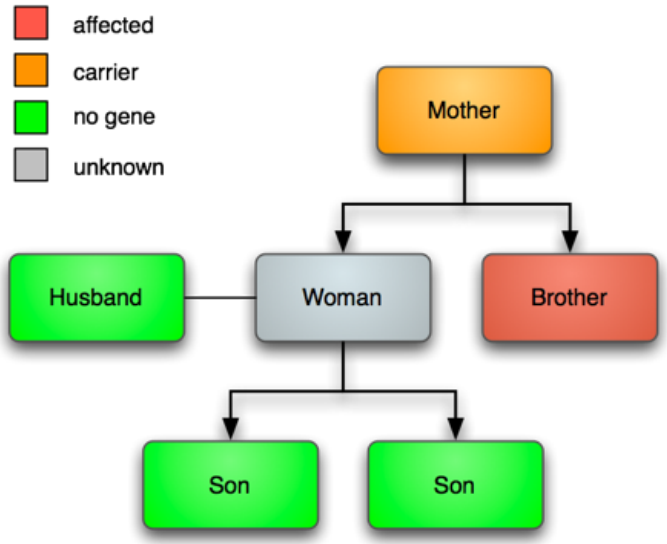
Bayes' Theorem in the 21st Century

Example: Genetic probabilities

Haemophilia is a rare genetic disorder that impairs the ability for the body's clotting factors to coagulate the blood in response to broken blood vessels. The disease is an **x-linked recessive** trait, meaning that there is only one copy of the gene in males but two in females, and the trait can be masked by the dominant allele of the gene.

This implies that males with 1 gene are *affected*, while females with 1 gene are unaffected, but *carriers* of the disease. Having 2 copies of the disease is fatal, so this genotype does not exist in the population.

In this example, consider a woman whose mother is a carrier (because her brother is affected) and who marries an unaffected man. Let's now observe some data: the woman has two consecutive (non-twin) sons who are unaffected. We are interested in determining **if the woman is a carrier**.



Bayes Marketing

The Bayesian approach:

1. This approach can be naturally applied to marketing analysis, and once again, reflects how business decisions are made in the real world: I have beliefs about how my business works (Prior),
2. I get new in formation all the time (Likelihood) and
3. I have to use both of these to make judgements about why things happened in the past and what might happen in the future (Posterior)

The use of Bayes and causal modelling in decision making, uncertainty and risk

These methods have the potential to transform risk analysis and decision making in all walks of life

1) Financial

2) Safety

3) Reliability

4) Legal

5) Medical

Bayesian Networks offer the following benefits:

A. Explicitly model causal factors:

B. Reason from effect to cause and vice versa

C. Overturn previous beliefs in the light of new evidence (also called ‘explaining away’)

D. Make predictions with incomplete data

E. Combine diverse types of evidence including both subjective beliefs and objective data.

Property value Prediction

Problem Formulation

A. Which factors influence the price of an house?

1. Does renovation of the house has some impact on price of an house?
2. Does location and price has correlation?
3. Age of the house and price do they have a relation?
4. How are the price variations over the different type of dwellings?
5. What type of sales have more scope with resect to Prices?
6. Are the Basement conditions affecting on Increase of SalesPrice?
7. The higher basements The more sales-prices?

Data Scrutiny

1. Some of the data points are of high value >70K
2. Some of the lot area is far more higher than others
3. Few observations have the values like Year of built are greater than the year of sold

Introduction to Dataset

DataFrame Structure:

```
> names(Casas_limpiado)
 [1] "Order"           "PID"             "MS SubClass"     "MS Zoning"       "Lot Frontage"    "Lot Area"        "Street"          "Alley"           "Lot Shape"
[10] "Land Contour"    "Utilities"       "Lot Config"      "Land Slope"      "Neighborhood"    "Condition 1"     "Condition 2"     "Bldg Type"       "House Style"
[19] "Overall Qual"    "Overall Cond"    "Year Built"      "Year Remod/Add"  "Roof Style"      "Roof Matl"       "Exterior 1st"    "Exterior 2nd"    "Mas Vnr Type"
[28] "Mas Vnr Area"    "Exter Qual"      "Exter Cond"      "Foundation"      "Bsmt Qual"       "Bsmt Cond"       "Bsmt Exposure"   "BsmtFin Type 1"  "BsmtFin SF 1"
[37] "BsmtFin Type 2"  "BsmtFin SF 2"    "Bsmt Unf SF"     "Total Bsmt SF"   "Heating"         "Heating QC"      "Central Air"     "Electrical"      "1st Flr SF"
[46] "2nd Flr SF"      "Low Qual Fin SF" "Gr Liv Area"     "Bsmt Full Bath"  "Bsmt Half Bath"  "Full Bath"       "Half Bath"       "Bedroom AbvGr"   "Kitchen AbvGr"
[55] "Kitchen Qual"    "TotRms AbvGrd"   "Functional"      "Fireplaces"      "Fireplace Qu"    "Garage Type"     "Garage Yr Blt"   "Garage Finish"   "Garage Cars"
[64] "Garage Area"     "Garage Qual"     "Garage Cond"     "Paved Drive"     "Wood Deck SF"    "Open Porch SF"   "Enclosed Porch"  "3Ssn Porch"      "Screen Porch"
[73] "Pool Area"       "Pool QC"         "Fence"           "Misc Feature"    "Misc Val"        "Mo Sold"         "Yr Sold"         "Sale Type"       "Sale Condition"
[82] "SalePrice"       "age"             "age_remod"       "age_remod_sale"  "ConstructionType" "Build_age_levels"
> dim(Casas_limpiado)
[1] 2051   87
```

Introduction to Dataset

Glance at Data:

Filter

	Order	PID	MS SubClass	MS Zoning	Lot Frontage	Lot Area	Street	Alley	Lot Shape	Land Contour	Utilities	Lot Config	Land Slope	Neighborhood	Condition 1	Condition 2	Bldg Type	House Style	Overall Qual
1	1	0526301100	020	RL	141	31770	Pave	NA	IR1	Lvl	AllPub	Corner	Gtl	NAmes	Norm	Norm	1Fam	1Story	6
2	2	0526350040	020	RH	80	11622	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NAmes	Feedr	Norm	1Fam	1Story	5
3	3	0526351010	020	RL	81	14267	Pave	NA	IR1	Lvl	AllPub	Corner	Gtl	NAmes	Norm	Norm	1Fam	1Story	6
4	4	0526353030	020	RL	93	11160	Pave	NA	Reg	Lvl	AllPub	Corner	Gtl	NAmes	Norm	Norm	1Fam	1Story	7
5	5	0527105010	060	RL	74	13830	Pave	NA	IR1	Lvl	AllPub	Inside	Gtl	Gilbert	Norm	Norm	1Fam	2Story	5
6	6	0527105030	060	RL	78	9978	Pave	NA	IR1	Lvl	AllPub	Inside	Gtl	Gilbert	Norm	Norm	1Fam	2Story	6
7	7	0527127150	120	RL	41	4920	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	StoneBr	Norm	Norm	TwnhsE	1Story	8
8	8	0527145080	120	RL	43	5005	Pave	NA	IR1	HLS	AllPub	Inside	Gtl	StoneBr	Norm	Norm	TwnhsE	1Story	8
9	9	0527146030	120	RL	39	5389	Pave	NA	IR1	Lvl	AllPub	Inside	Gtl	StoneBr	Norm	Norm	TwnhsE	1Story	8
10	10	0527162130	060	RL	60	7500	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	Gilbert	Norm	Norm	1Fam	2Story	7
11	11	0527163010	060	RL	75	10000	Pave	NA	IR1	Lvl	AllPub	Corner	Gtl	Gilbert	Norm	Norm	1Fam	2Story	6
12	13	0527166040	060	RL	63	8402	Pave	NA	IR1	Lvl	AllPub	Inside	Gtl	Gilbert	Norm	Norm	1Fam	2Story	6
13	14	0527180040	020	RL	85	10176	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	Gilbert	Norm	Norm	1Fam	1Story	7
14	16	0527216070	060	RL	47	53504	Pave	NA	IR2	HLS	AllPub	CulDSac	Mod	StoneBr	Norm	Norm	1Fam	2Story	8
15	17	0527225035	050	RL	152	12134	Pave	NA	IR1	Bnk	AllPub	Inside	Mod	Gilbert	Norm	Norm	1Fam	1.5Fin	8
16	19	0527276150	020	RL	140	19138	Pave	NA	Reg	Lvl	AllPub	Corner	Gtl	Gilbert	Norm	Norm	1Fam	1Story	4
17	20	0527302110	020	RL	85	13175	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NWAmes	Norm	Norm	1Fam	1Story	6
18	21	0527358140	020	RL	105	11751	Pave	NA	IR1	Lvl	AllPub	Inside	Gtl	NWAmes	Norm	Norm	1Fam	1Story	6
19	22	0527358200	085	RL	85	10625	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NWAmes	Norm	Norm	1Fam	SFoyer	7
20	26	0527403020	020	RL	65	8450	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NAmes	Norm	Norm	1Fam	1Story	5
21	27	0527404120	020	RL	70	8400	Pave	NA	Reg	Lvl	AllPub	Corner	Gtl	NAmes	Norm	Norm	1Fam	1Story	4
22	29	0527427230	120	RH	26	5858	Pave	NA	IR1	Lvl	AllPub	FR2	Gtl	NAmes	Norm	Norm	TwnhsE	1Story	7
23	30	0527451180	160	RM	21	1680	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	BrDale	Norm	Norm	Twnhs	2Story	6
24	31	0527451330	160	RM	21	1680	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	BrDale	Norm	Norm	Twnhs	2Story	5
25	32	0527451410	160	RM	21	1680	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	BrDale	Norm	Norm	Twnhs	2Story	6
26	33	0527452190	120	RL	53	4043	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NPkVill	Norm	Norm	TwnhsE	1Story	6
27	34	0527453130	160	RL	24	2280	Pave	NA	Reg	Lvl	AllPub	FR2	Gtl	NPkVill	Norm	Norm	Twnhs	2Story	6
28	35	0527453150	120	RL	24	2280	Pave	NA	Reg	Lvl	AllPub	FR2	Gtl	NPkVill	Norm	Norm	Twnhs	1Story	7
29	36	0527454200	160	RL	24	2280	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NPkVill	Norm	Norm	Twnhs	2Story	6
30	38	0528112020	020	RL	98	11478	Pave	NA	Reg	Lvl	AllPub	Inside	Gtl	NridgHt	Norm	Norm	1Fam	1Story	8

Showing 1 to 31 of 2,051 entries

Introduction to Dataset

Data Transformations:

1. Age of a building has been calculated as (Year of Sold - Year of Built)
2. A building can be classified as **New Construction** if it's year of Built is as same as the year of remodel or-else it can be under **Remodeled/ Additionals**
3. Building age levels are grouped as showed in the table

AGE	Building Age Levels
Between (0,1)	Very Recent
Between(2,5)	Recent
Between(6,10)	Little Recent
Between(11,30)	Little Old
Between(31,60)	Moderate Old
Between(61,100)	Very Old
>=101	VeryVery Old

Introduction to Dataset

Data Transformations:

Zoning classification of the sale

A	Agriculture
C	Commercial
FV	Floating Village Residential
I	Industrial
RH	Residential High Density
RL	Residential Low Density
RP	Residential Low Density Park
RM	Residential Medium Density

Type of Sale

WD	Warranty Deed - Conventional
CWD	Warranty Deed - Cash
VWD	Warranty Deed - VA Loan
New	Home just constructed and sold
COD	Court Officer Deed/Estate
Con	Contract 15% Down payment regular terms
ConLw	Contract Low Down payment and low interest
ConLI	Contract Low Interest
ConLD	Contract Low Down
Oth	Other

Basement Quality- Height of Basement

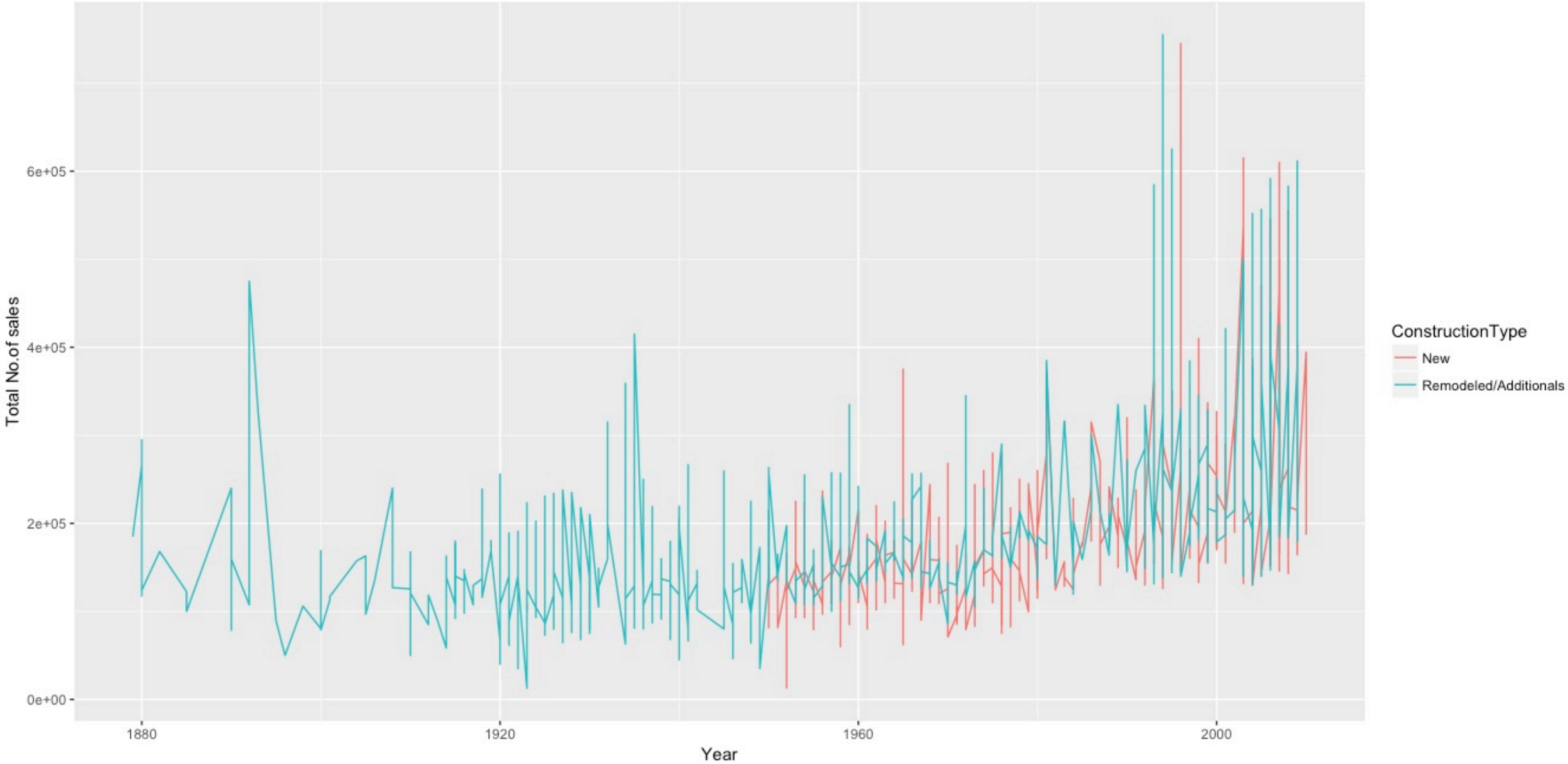
Ex	Excellent (100+ inches)
Gd	Good (90-99 inches)
TA	Typical (80-89 inches)
Fa	Fair (70-79 inches)
Po	Poor (<70 inches
NA	No Basement

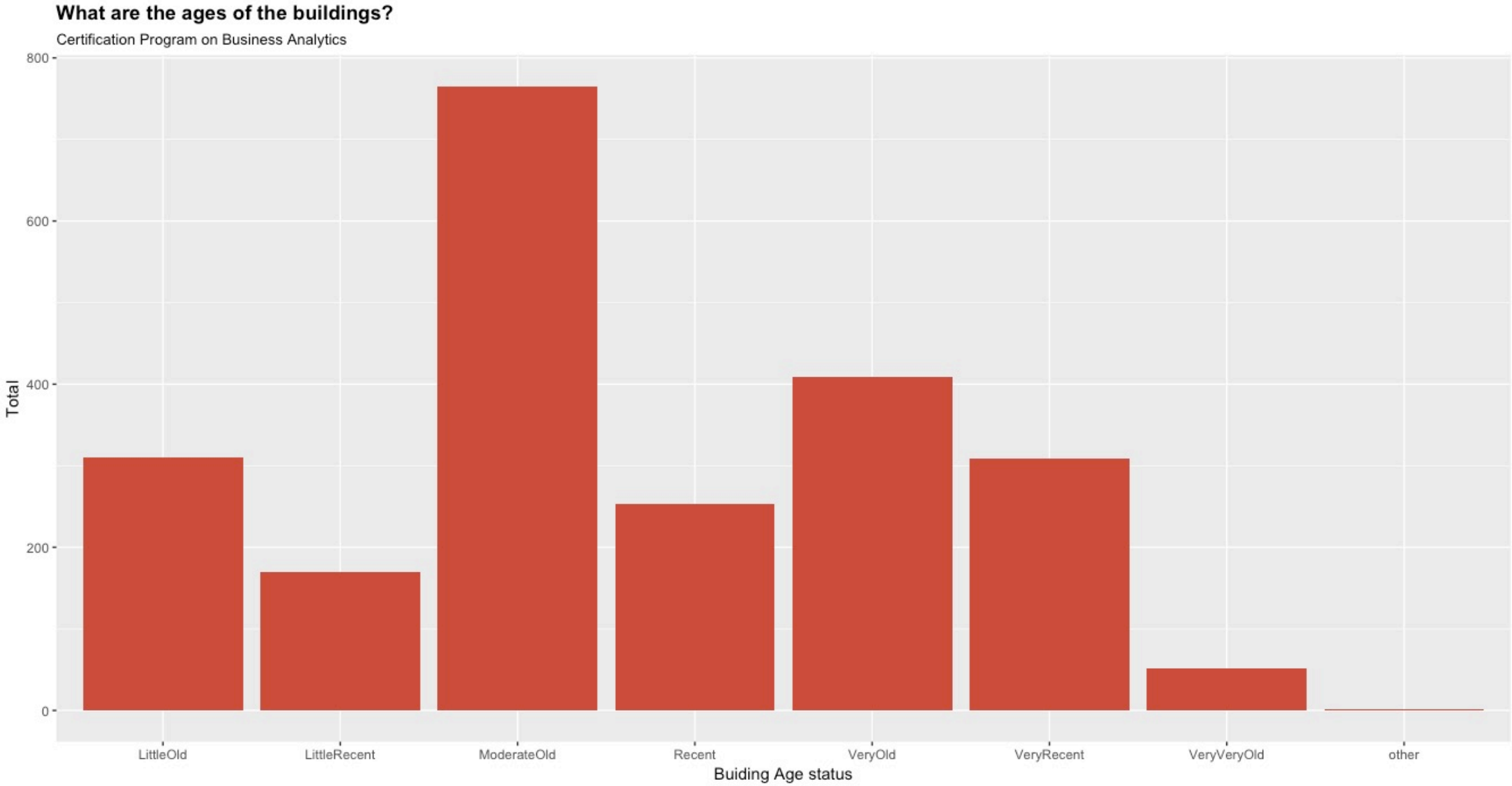
Basement Condition

Ex	Excellent
Gd	Good
TA	Typical - slight dampness allowed
Fa	Fair - dampness or some cracking or settling
Po	Poor - Severe cracking, settling, or wetness
NA	No Basement

How are the sale prices per the different constructions over the years

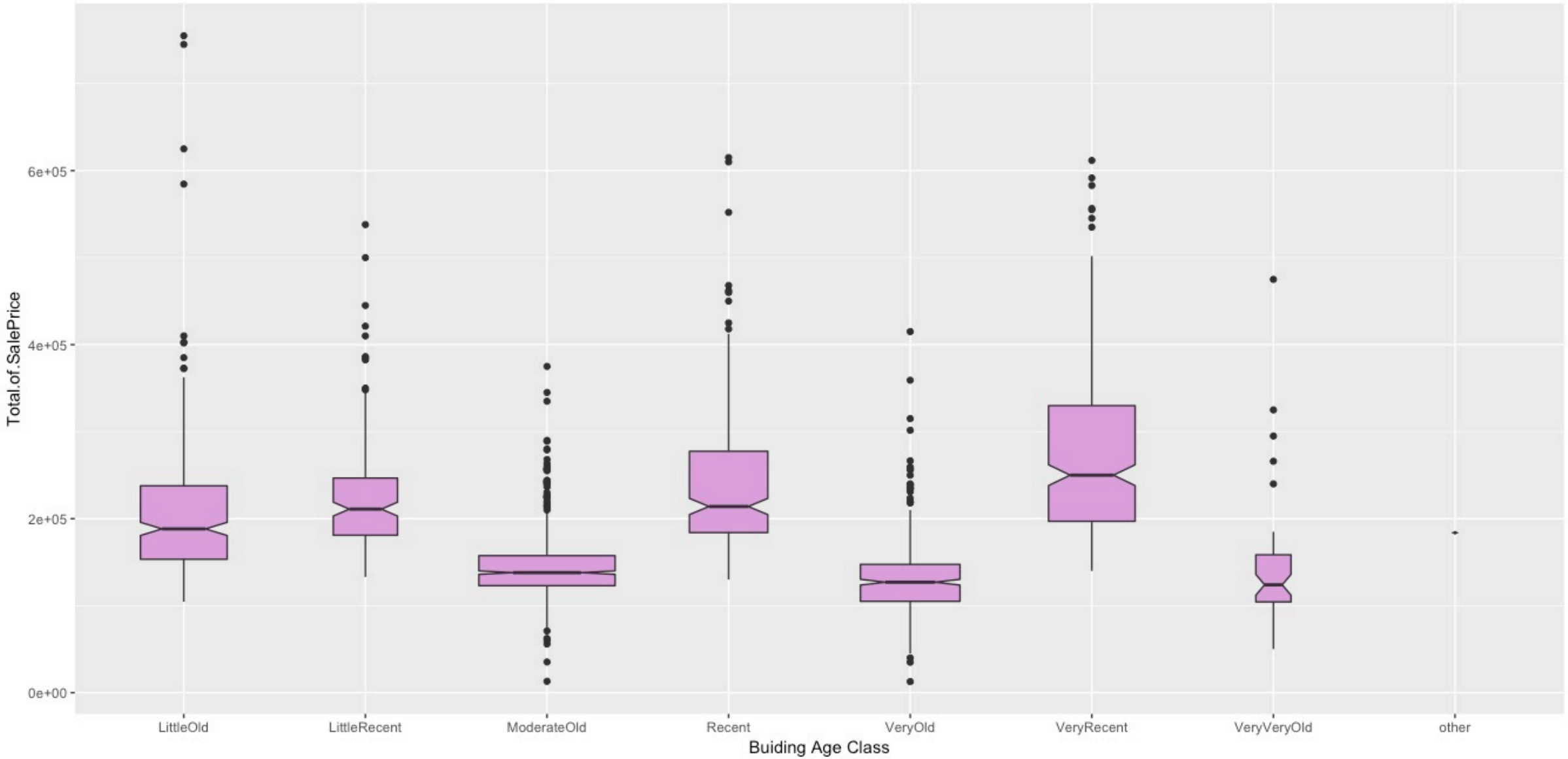
Certification Program on Business Analytics




What are the ages of the buildings?
Certification Program on Business Analytics
800
600
400
200
0
Total
LittleOld
LittleRecent
ModerateOld
Recent
VeryOld
VeryRecent
VeryVeryOld
other
Buiding Age status

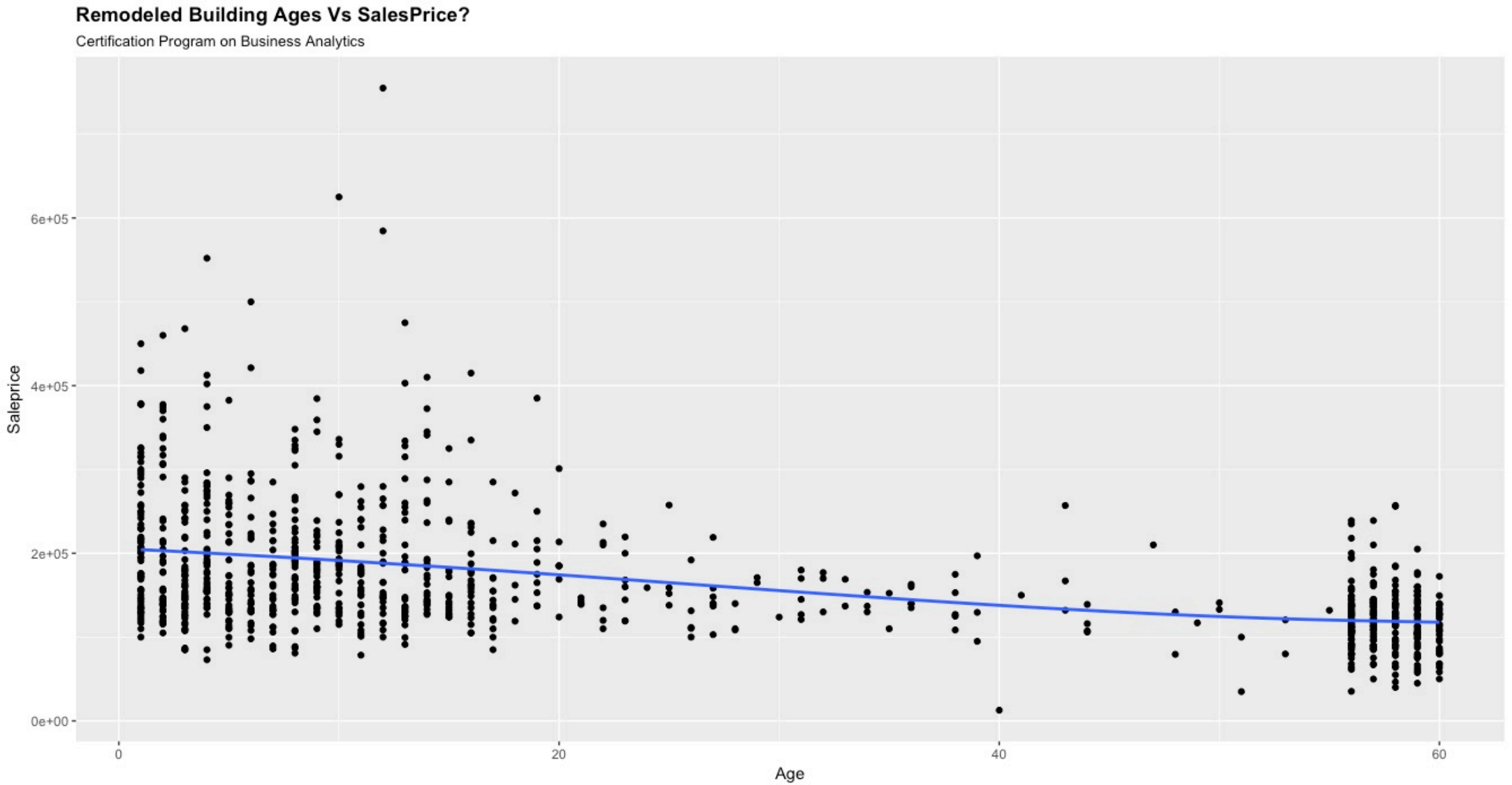
How are the sale prices per the different age classes of Buildings?

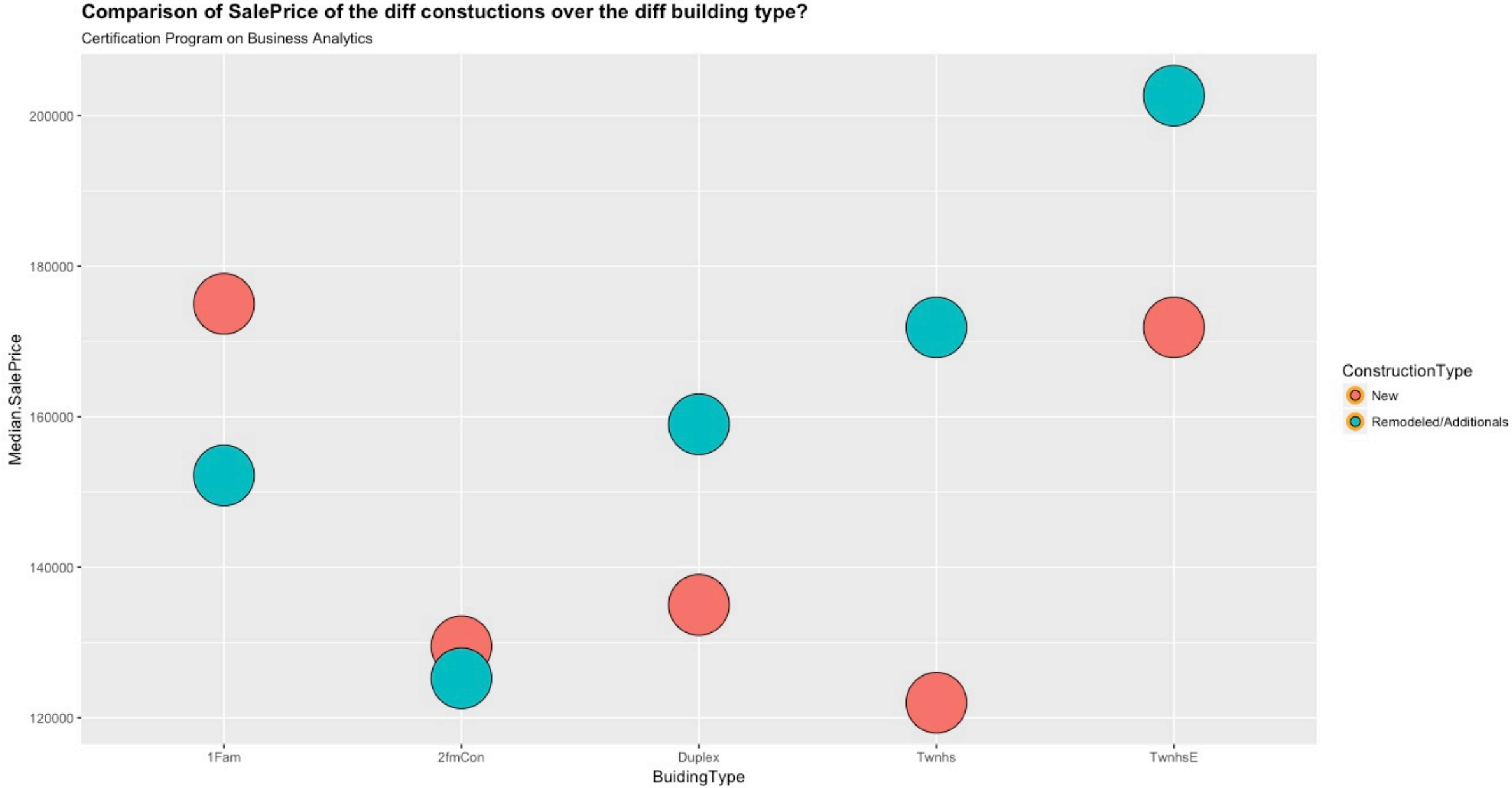
Certification Program on Business Analytics

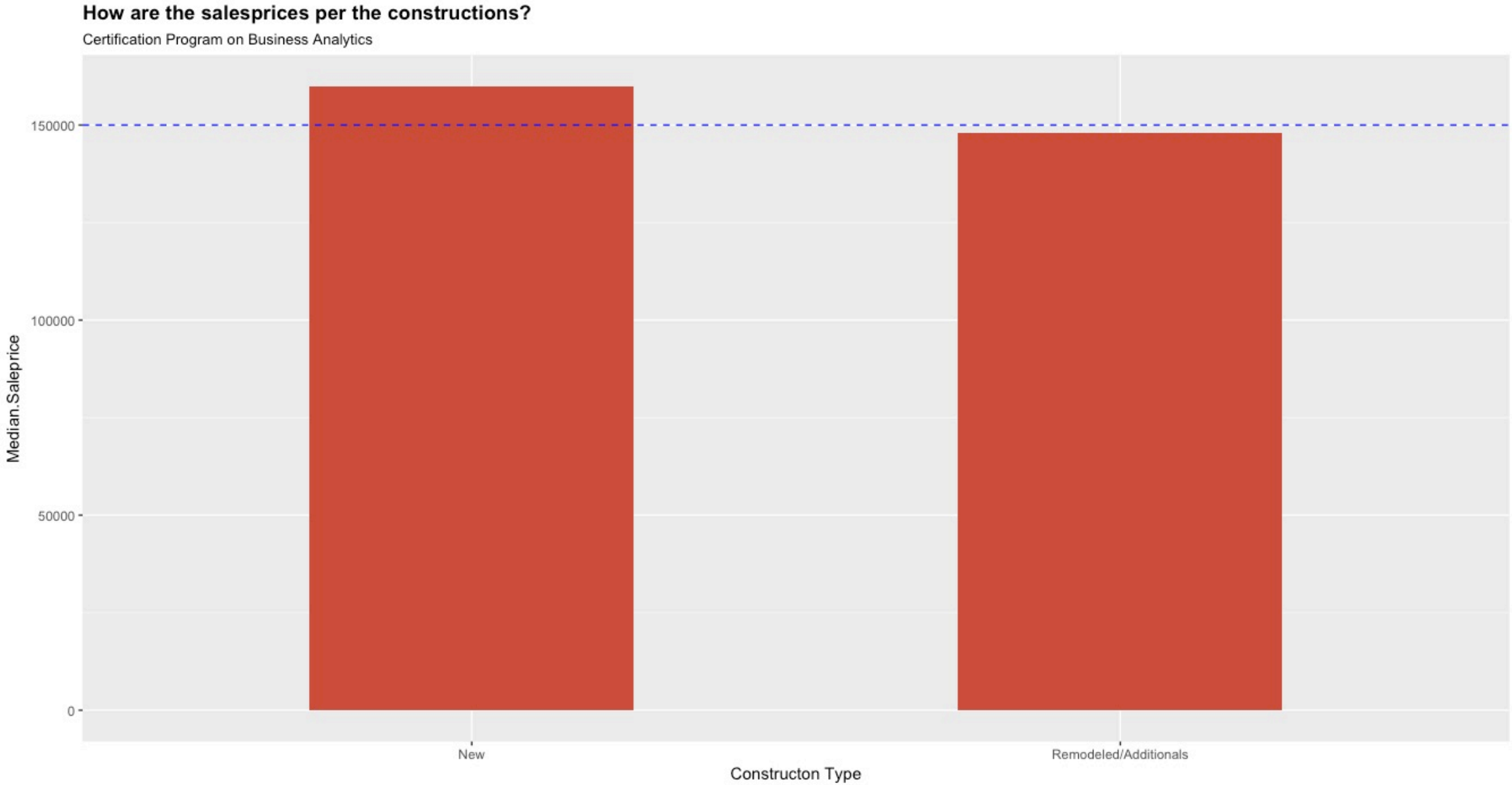


Building Ages Vs SalesPrice?

Certification Program on Business Analytics

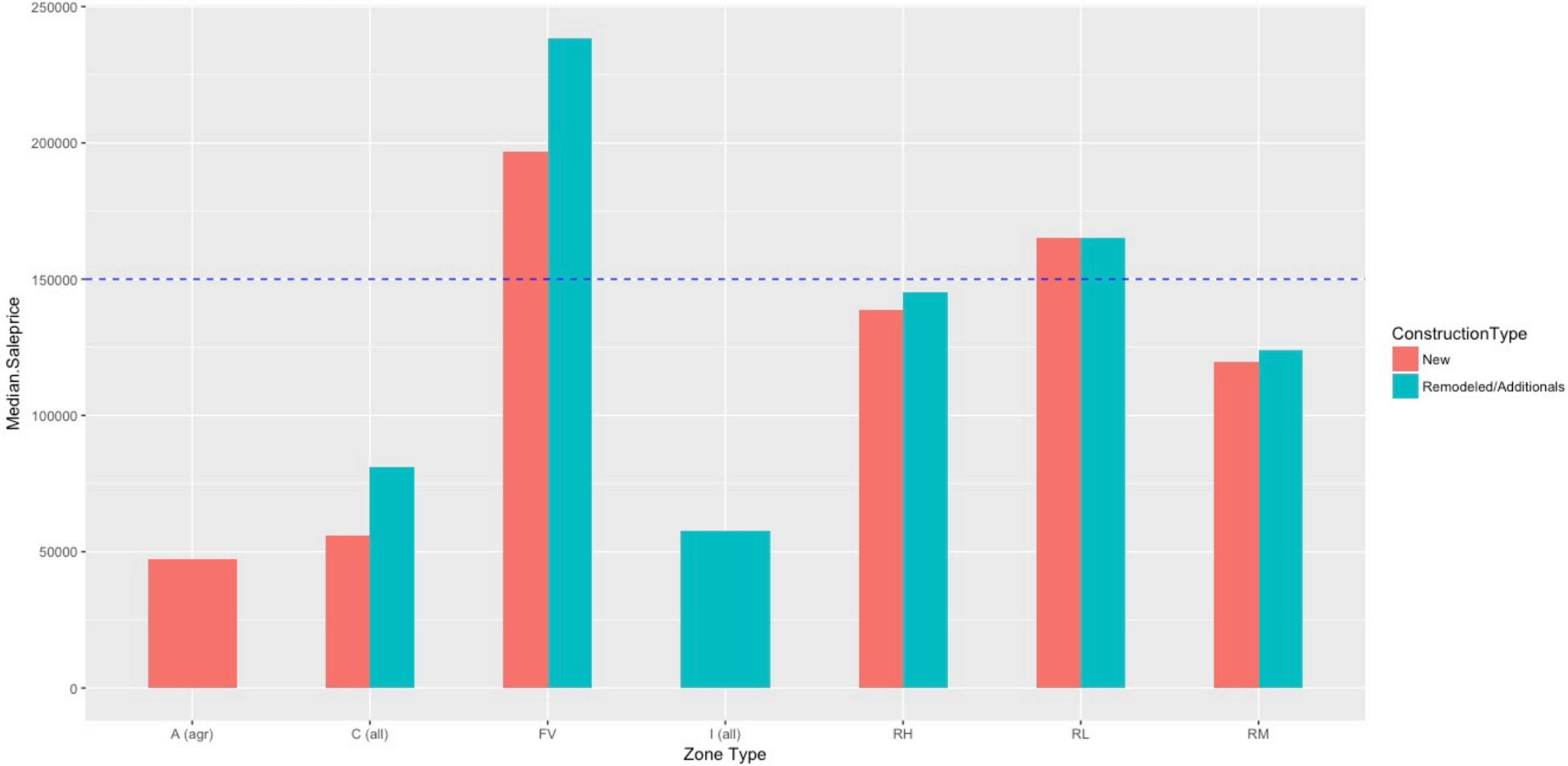

Remodeled Building Ages Vs SalesPrice?
Certification Program on Business Analytics
Saleprice
6e+05
4e+05
2e+05
0e+00
0
20
40
60
Age

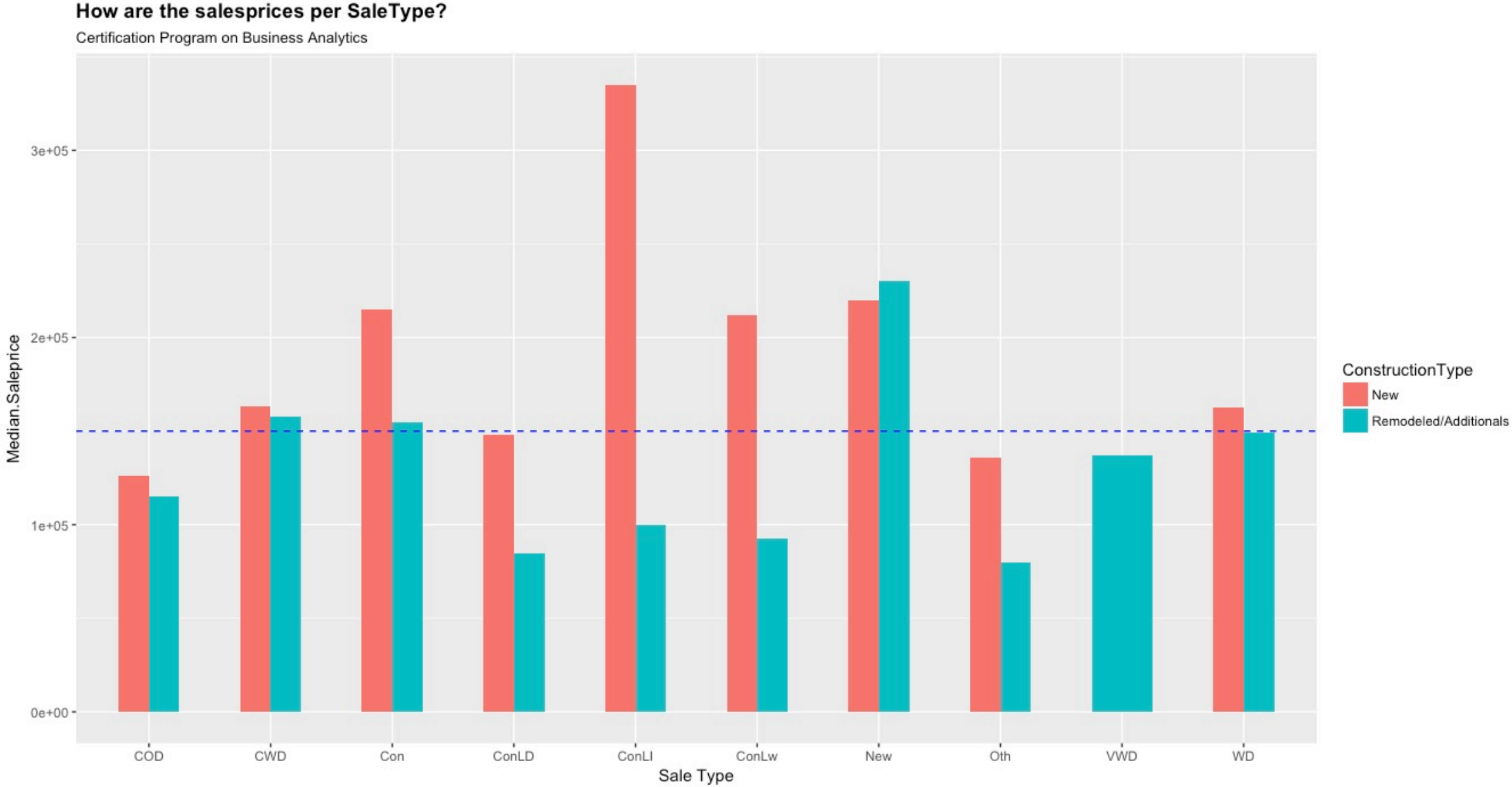

Comparison of SalePrice of the diff constuctions over the diff building type?
Certification Program on Business Analytics
Median.SalePrice
200000
180000
160000
140000
120000
1Fam
2fmCon
Duplex
Twnhs
TwnhsE
BuidingType
ConstructionType
New
Remodeled/Additionals


How are the salesprices per the constructions?
Certification Program on Business Analytics
150000
100000
50000
0
Median.Saleprice
New
Remodeled/Additionals
Constructon Type

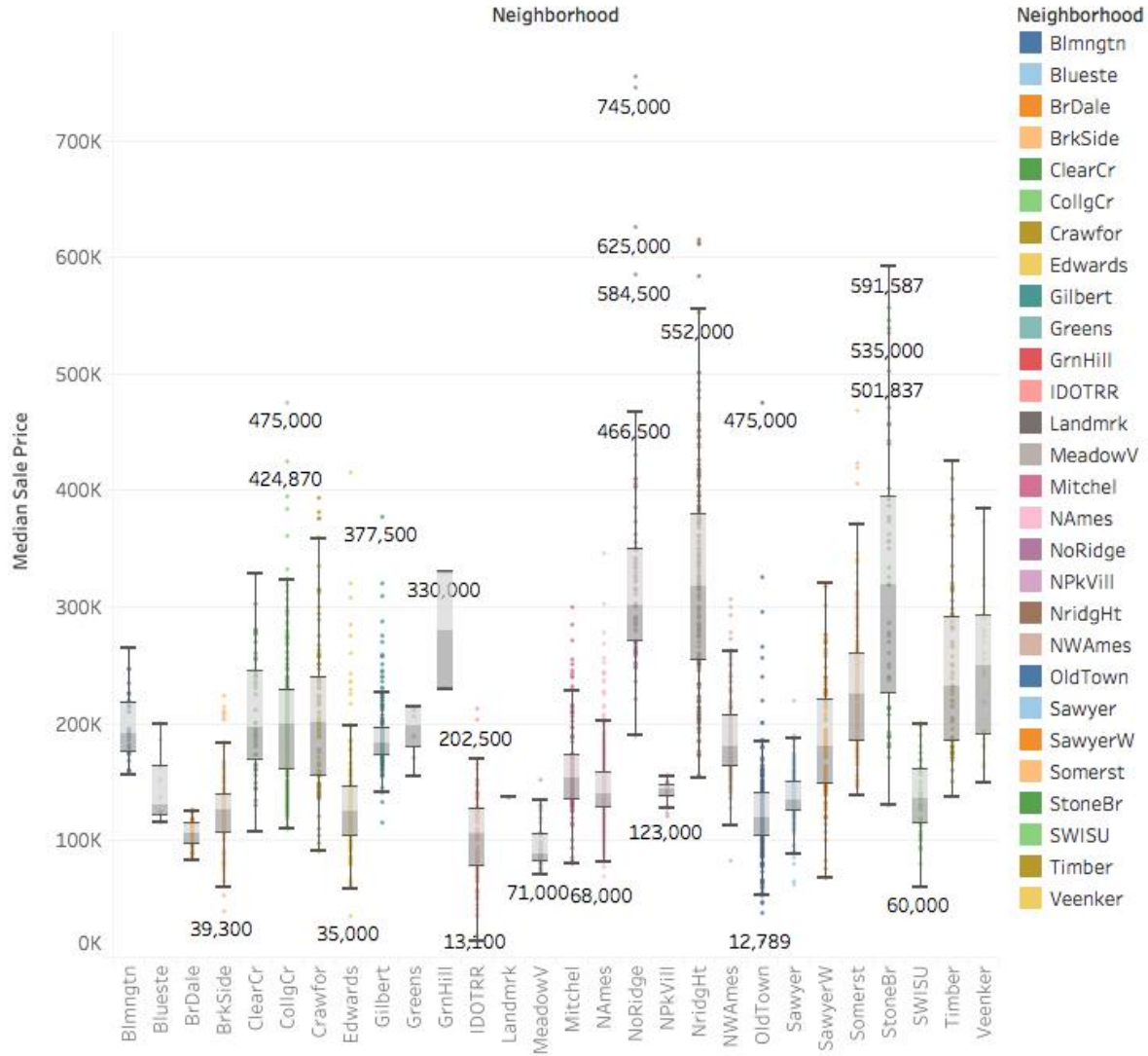
How are the salesprices per the zones?

Certification Program on Business Analytics



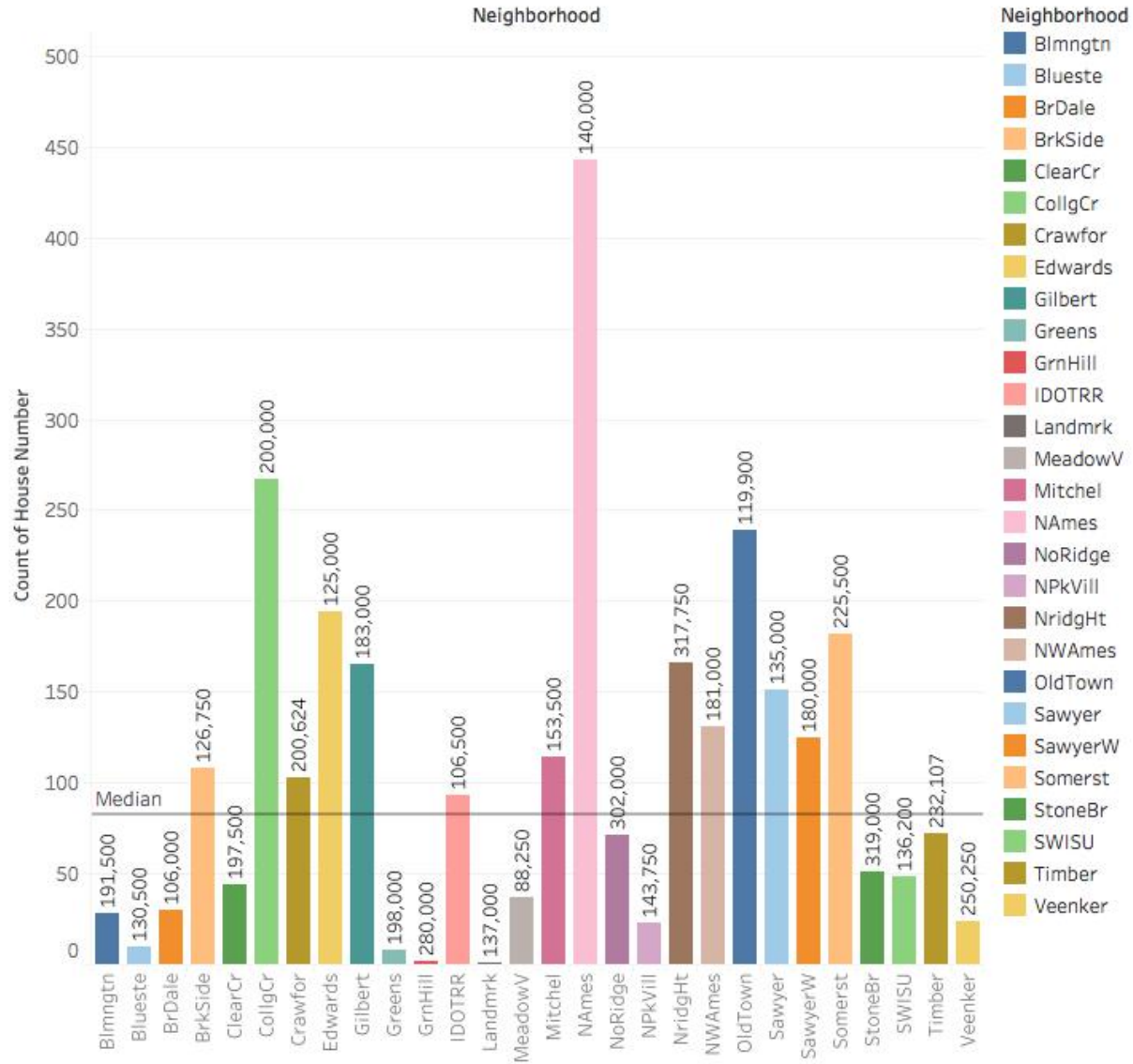

How are the salesprices per SaleType?
Certification Program on Business Analytics
Median.Saleprice
3e+05
2e+05
1e+05
0e+00
COD
CWD
Con
ConLD
ConLI
ConLw
New
Oth
VWD
WD
Sale Type
ConstructionType
New
Remodeled/Additionals

Most Expensive Neighborhood



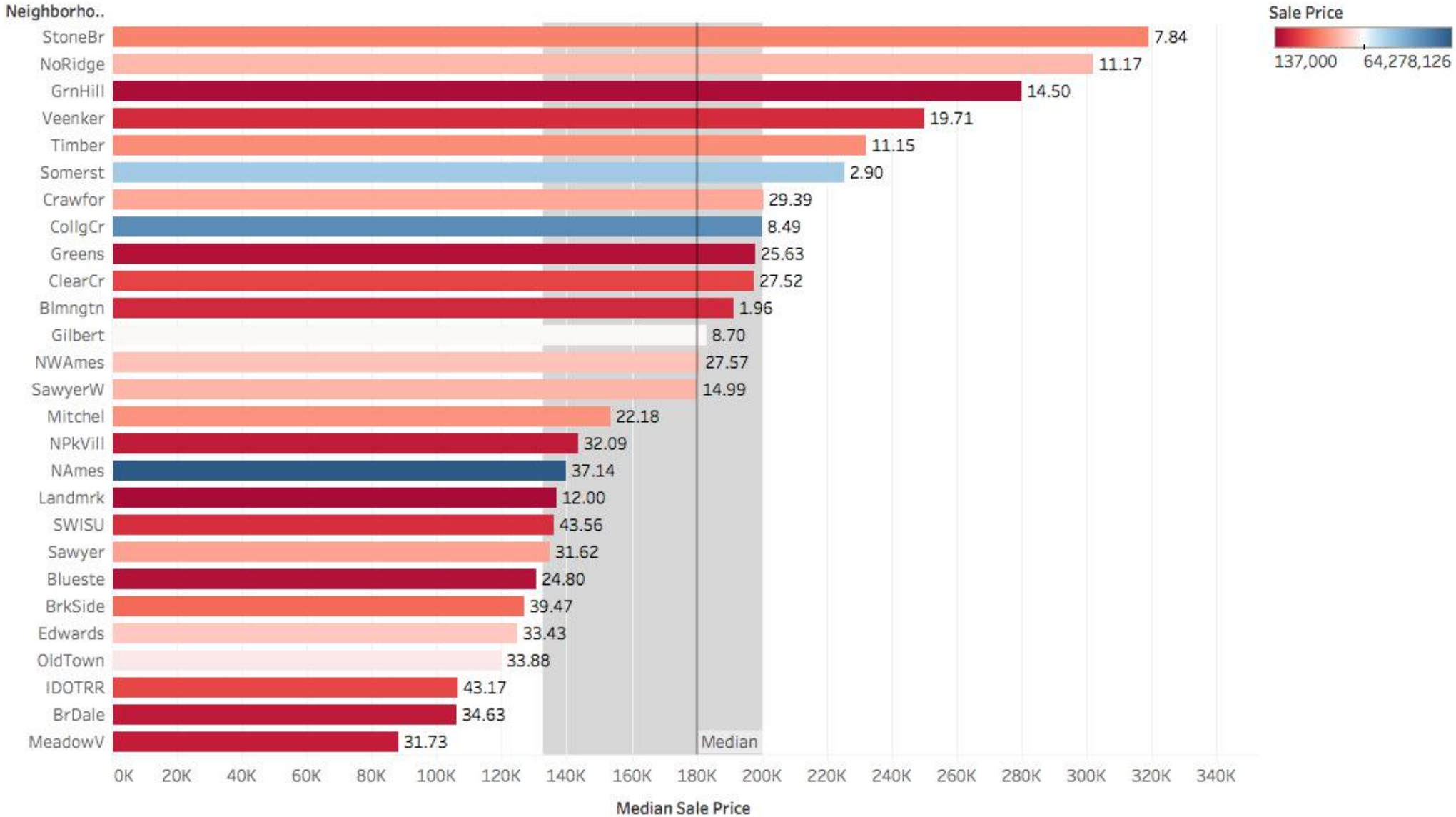
Median Sale Price for each Neighborhood. Color shows details about Neighborhood. The marks are labeled by Median Sale Price. Details are shown for Neighborhood. The view is filtered on Neighborhood, which keeps 28 of 28 members.

Count of Houses Per Neighbourhood



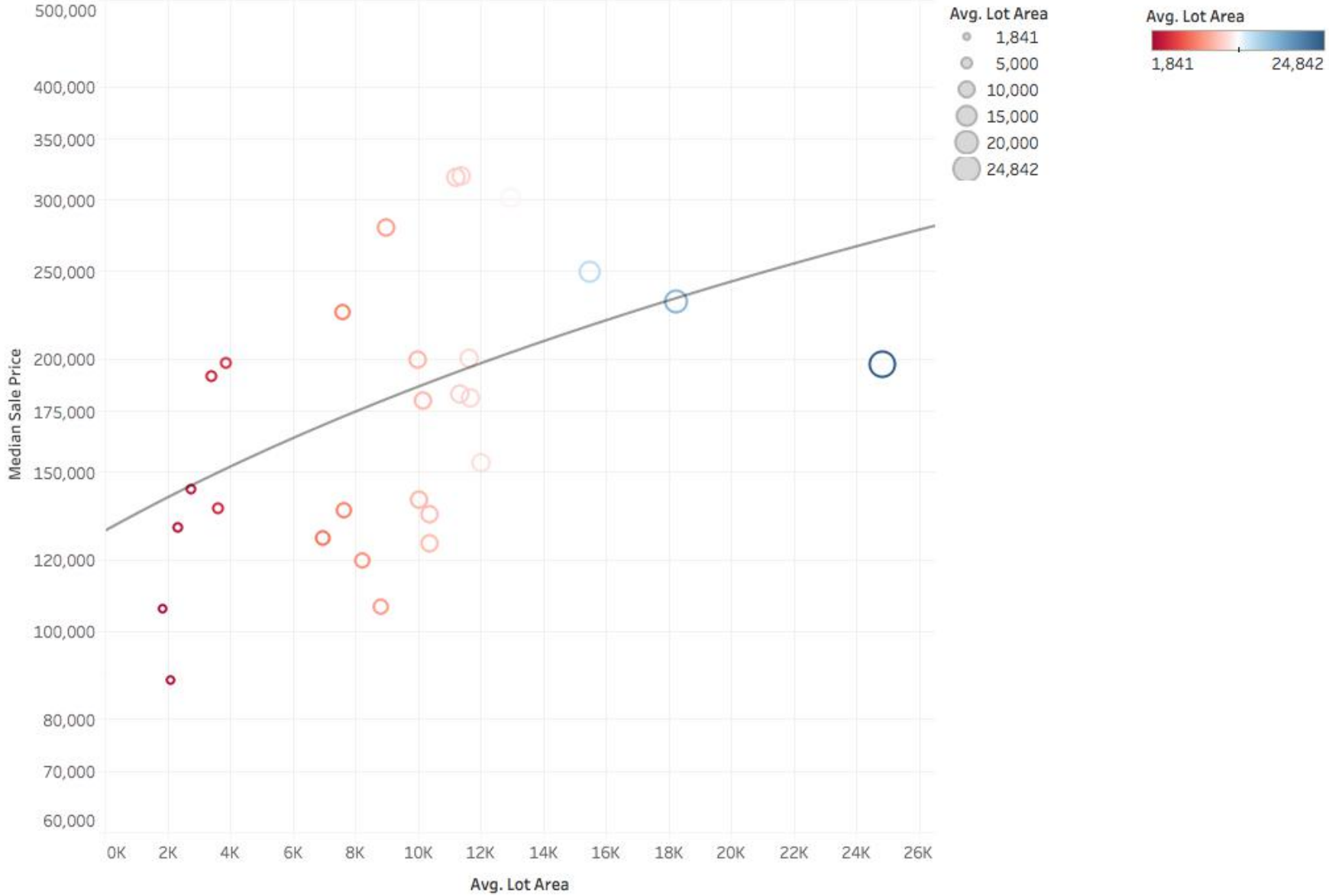
Count of House Number for each Neighborhood. Color shows details about Neighborhood. The marks are labeled by median of Sale Price. The view is filtered on Neighborhood, which keeps 28 of 28 members.

Neighborhood having newest Houses

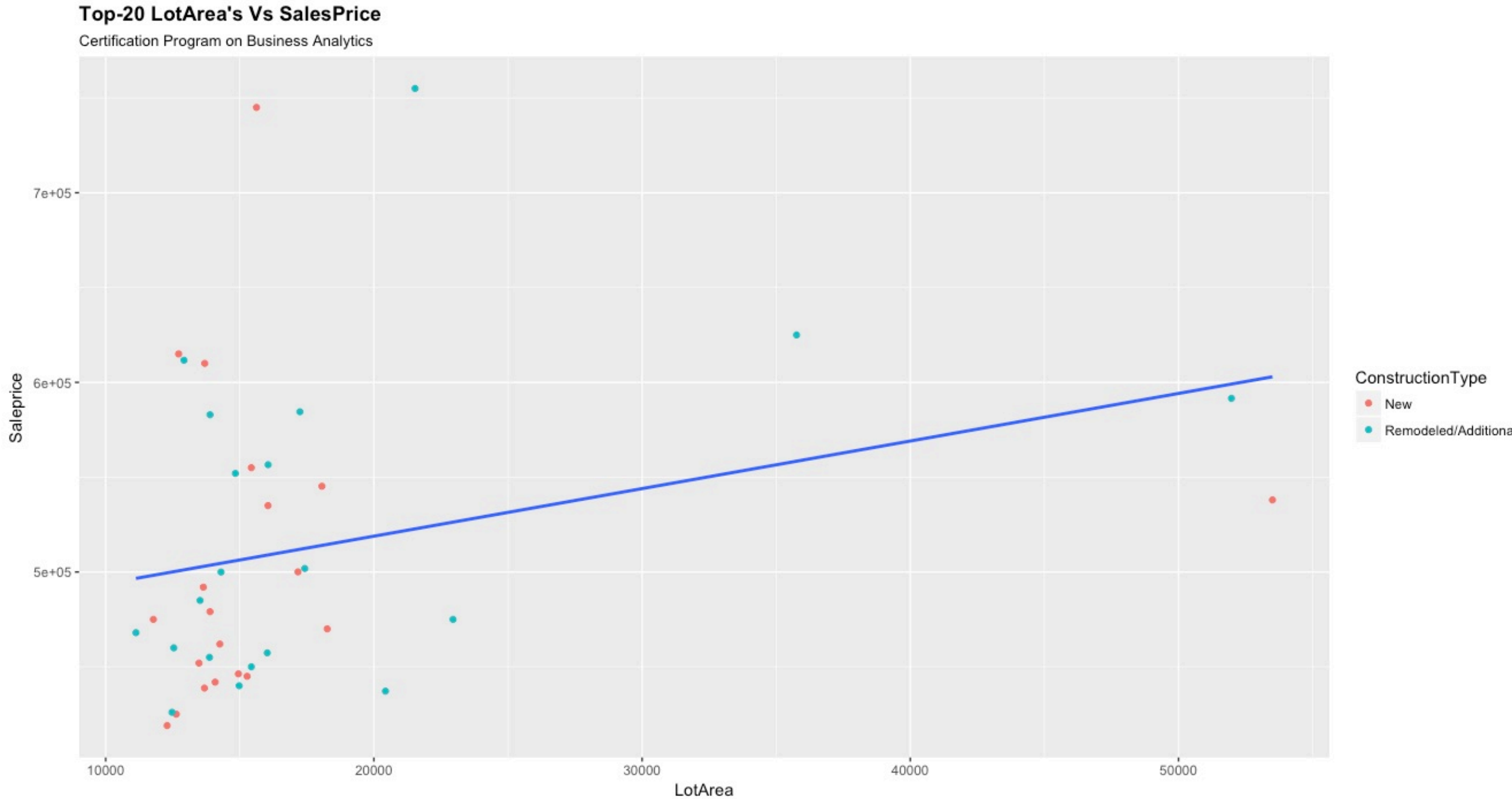


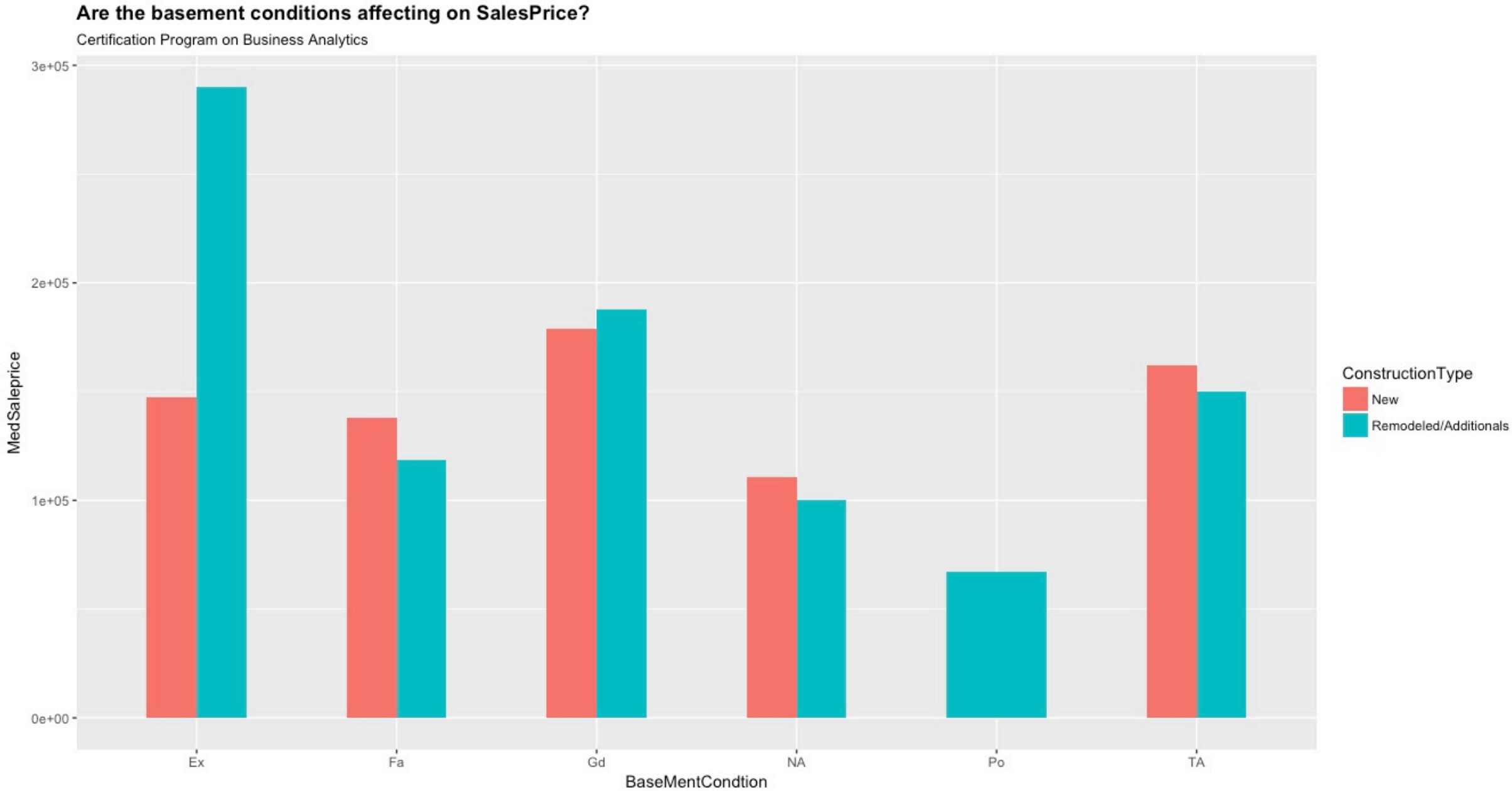
Median of Sale Price for each Neighborhood. Color shows sum of Sale Price. The marks are labeled by average of Age of Building from Remodelling. The data is filtered on Yr Sold Year, which keeps multiple members. The view is filtered on average of Age of Building from Remodelling, which ranges from 1.80 to 43.56 and keeps Null values.

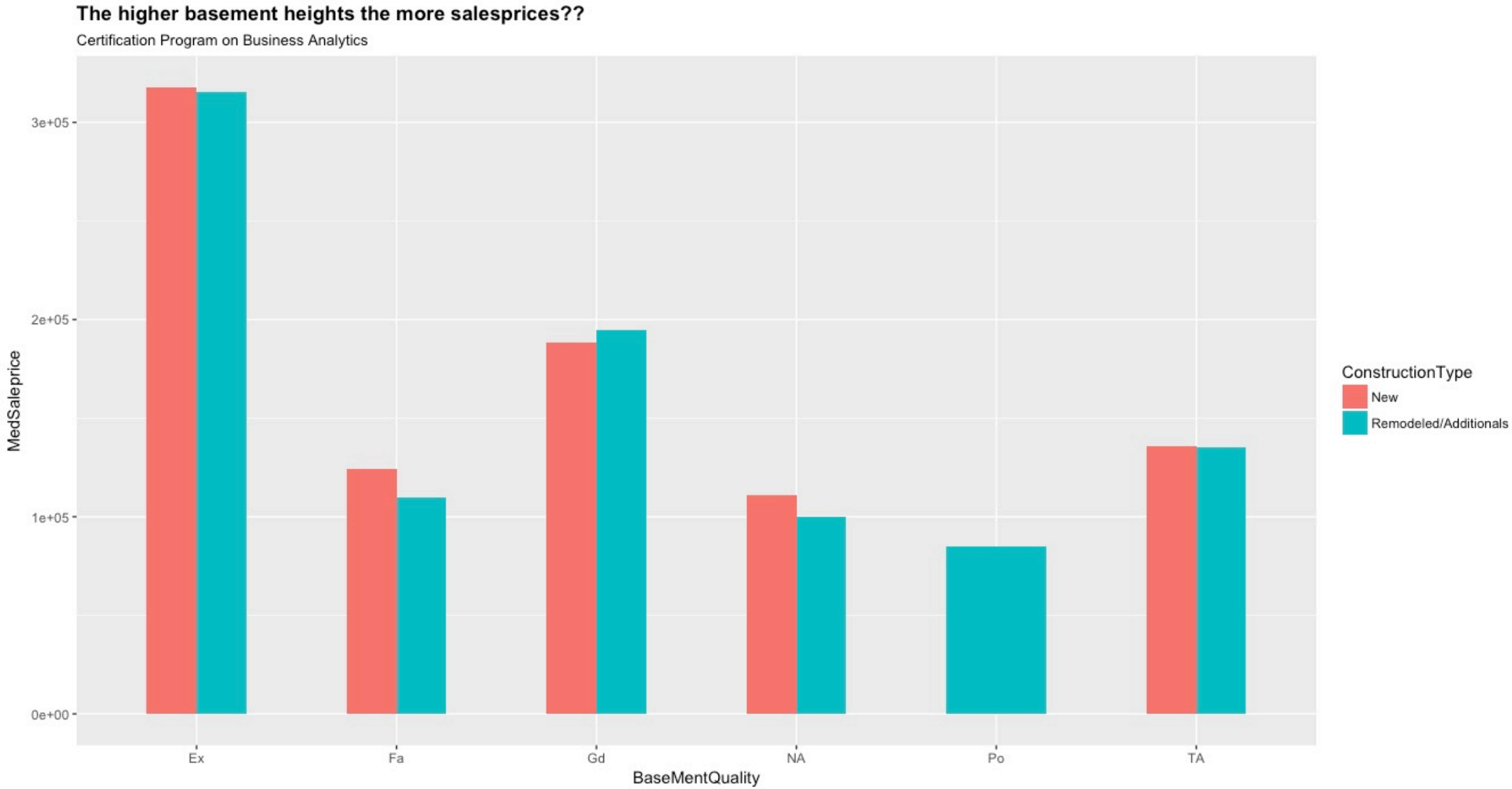
Lot Area Vs SalePrice



Average of Lot Area vs. median of Sale Price. Color shows average of Lot Area. Size shows average of Lot Area. Details are shown for Neighborhood. The view is filtered on Neighborhood, which keeps 28 of 28 members.

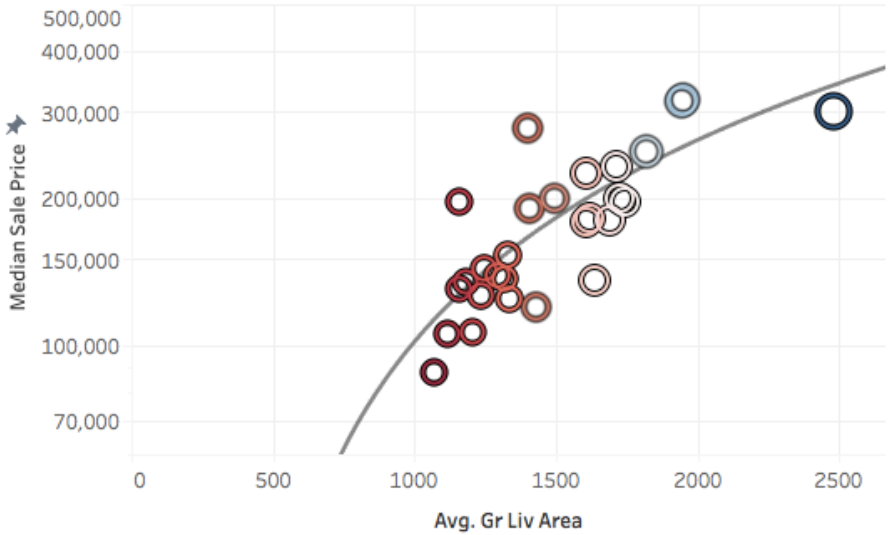

Top-20 LotArea's Vs SalesPrice
Certification Program on Business Analytics
Saleprice
7e+05
6e+05
5e+05
10000
20000
30000
40000
50000
LotArea
ConstructionType
New
Remodeled/Additiona


Are the basement conditions affecting on SalesPrice?
Certification Program on Business Analytics
3e+05
2e+05
1e+05
0e+00
MedSaleprice
Ex
Fa
Gd
NA
Po
TA
BaseMentCondtion
ConstructionType
New
Remodeled/Additionals

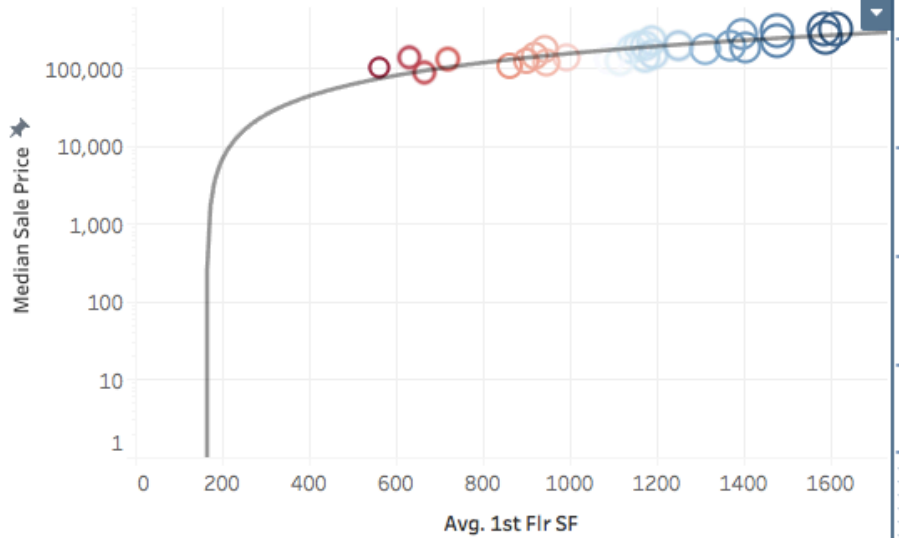

The higher basement heights the more salesprices??
Certification Program on Business Analytics
MedSaleprice
3e+05
2e+05
1e+05
0e+00
Ex
Fa
Gd
NA
Po
TA
BaseMentQuality
ConstructionType
New
Remodeled/Additionals

Sales Price vs Area of House

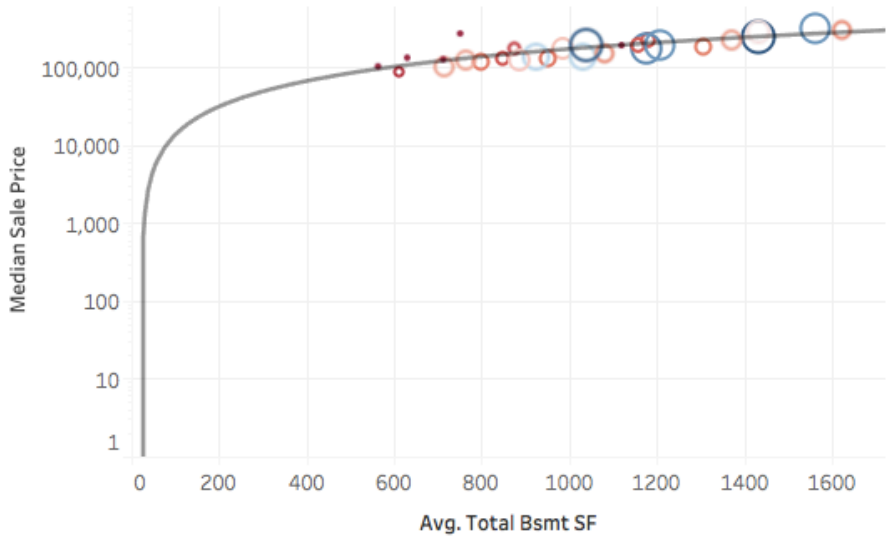
Ground Living Area



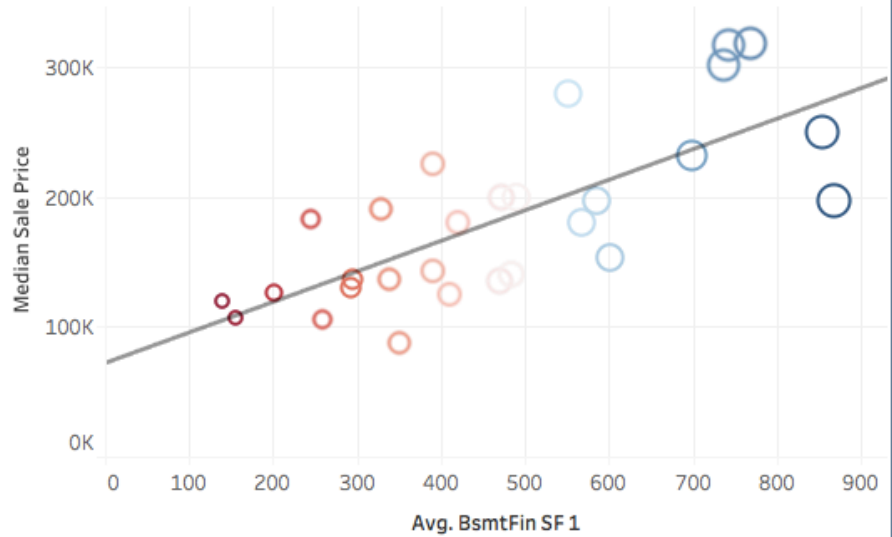
1st Flr SF



Total Bsmt SF

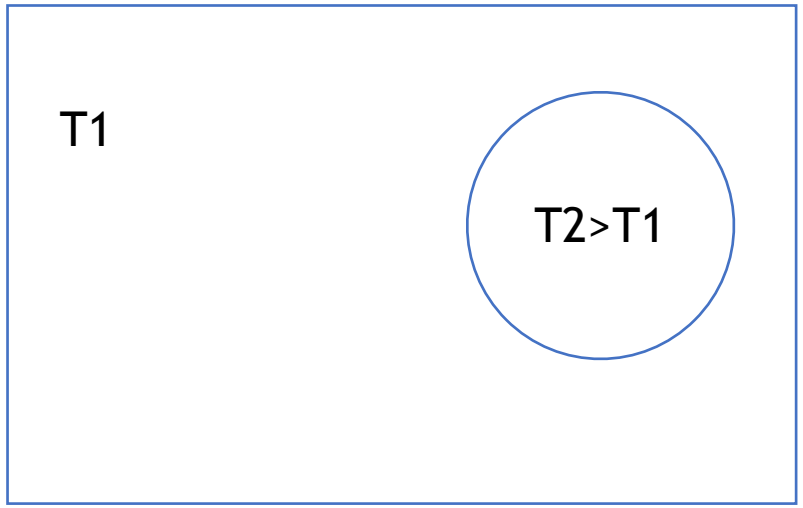


BsmtFin SF 1



Complete Business Stats Exercises

2-7 Answer:



On tossing two dices there would be 36 possible outcomes, Here T1=36

When the second toss is greater than first there would be 15 possible outcome T215

P(T2>T1)= 15/16=0.417

2-9 Answer

The union and the intersection of of the events S and B are as follows

Purchase stock or bonds, or both : $S \cup B$

Purchase stock and bonds :$S \cap B$:

2-11 Answer

Investments in Public Sector(PS) - 8%

Investments in Corporate Funds(CF) - 6%

Investments in Both sectors - 2%

What is the probability that the investor has either public or corporate funds ?

$P(PS \cup CF) = P(PS) + P(CF) - P(PS \cap CF) = 0.08 + 0.06 - 0.02 = 0.12$

Probability that the investor has either public or corporate funds would be 0.12 I.e 12%

2-19 Answer

1. The two events are mutually exclusive.

2. Let 0, D be the events: machine is out-of-control, down (respectively).

Then we need $P(O \cup D) = P(O)+P(D)-P(O \cap D) = 0.02+0.015-0=0.35$

3. $P(\underline{D}) = 1- P(D) = 1-0.015= 0.985$ This event and D are mutually exclusive. (Note I didn't get the complementary symbol - that's the reason I put it below D)

2-20 Answer

The Probability that the chosen manager will be either a woman or over 50 years old or both is

P(W)+P(Age>50)–P(Woman with Age >50)=12/20+2/20–2/20=0.6

The probability that the chosen manager will be under age 30 is

P(age< 30) = 2/20 = 0.1

2-23 Answer

Total No of Employees - 550

The candidates who have had Vocational Training(V) = 412/550= 0.74

The candidates who have done College Education(C) = 380/550= 0.69

The candidates who have done College Education and Vocational Training($V \cap C$)= 357/550= 0.71

What is the probability that he or she is college educated or had vocational training?

$P(V \cup C) = P(V) + P(C) - P(V \cap C) = 0.74 + 0.69 - 0.71 = 0.72$

2-28 Answer

Keeping these in mind IN is an event for Interest goes up and MK is an event for Market goes up

P(IN)=0.4

The stock market will go up P(MK|IN)=0.80

What is the probability that market will go up and interest rates will go down during the period is

$P(MK \cap IN)=P(MK|IN)*P(IN) = 0.80*0.4=0.32$

2-31 Answer

	EAST	South	MidWest	West	
Hospitalization	75	128	29	52	284
Pysician's visit	233	514	104	251	1102
Outpatients treatments	100	326	65	99	590
	408	968	198	402	1976

1. P(Midwest)=198/1976 =0.10
2. P(East) = 408/1976 =0.21
3. P(Midwest U South) = (198+968)/1976 = 1166/1976=0.59
4. (Hospitalisation) = 284/1976=0.143
5. P(South|Hospitalisation)= P(South∩Hospitalisation)/P(Hospitalisation)=(128/1976)/(284/1976) =0.45
6. P(Physician|East)= P(Physician∩East)/P(East)=(233/1976)/(408/1976) =0.57
7. P(West|outpatient)=P(West∩OP)/P(OP)=(99/1976)/(590/1976) =0.17
8. P(EastUOP)= P(East)+P(OP)-P(East ∩ OP)=(408+590-100)/1976 =898/1976=0.45
9. P(Hospitalisation U South)= P(Hospitalisation)+P(South)-P(Hospitalisation ∩ South)=(284+968-128)/1976=0.57

2-33 Answer

	price increase	No Increase	Total
Dividends paid	34	78	112
No dividends	85	49	134
Total	119	127	246

1. P(Price increase) = 119/246= 0.48

2. P(Dividend) = 112/246 = 0,45

3. P(Increase ∩ Dividend)= 34/246 = 0.13

4. P(No dividend ∩ No increase)=49/246 = 0,19

5. P(Dividends | Increase)= P(Increase ∩ Dividend)/P(Increase) = 34/119 = 0.28

6. P(Increase | no Dividend) = P(Increase ∩ no Dividend)/P(no dividend) =85/134 = 0.63

7. P(Increase U Dividend) = P(Increase)+P(Dividend)-P(increase ∩ dividend) = (119+112-34)/246 =197/246 = 0.80

2-40 Answer

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The probability of failure of component A and B's are P(A)=0.02, P(B)=0.1

And the probability that the device will work satisfactory if the components work together as follows

P(Device works satisfactorily) = 1 – P(A ∩*B*) = 1 – (0.02)(0.1) = 1 – 0.002 = 0.998

2-42 Answer

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Chance of making money for ABN is P(ABN)=0.90,

Chance of making money for AXA is P(AXA)=0.75

Chance of making money for ING is P(ING)=0.6

And these three are independent each other

P(at-least one investment will make money) =

1 – P(ABN') * P(AXA') * P(ING') = 1 - (1-0.90)(1-0.75)(1-0.6)

= 1- (0.1)(0.25)(0.4)

=1- 0.01

=0,99

2-52 Answer

Total Number of people in each dept as

n(Manufacturing)=55, n(Distribution)=30, n(marketing)=21, n(management)=13

The possible ways of selecting one person each = (55)*(30)*(21)*(13)=450450

2-55 Answer

The possible ordered choices of three out of six candidates are

6P3 = 6! / (6–3)! = (6)(5)(4) = 120 ordered choices

2-61 Answer

The events: the drug is approved as A, and the drug has side effects as S

P(Approved **|** No side effect) = 0.95

P(Approved **|** Side effect) =. 0.5

P(Side effect)=0.2

P(Approved)= P(Approved **|** No side effect)*P(No side effect) + P(Approved **|** Side effect) * P(Side effect)

= 0.95*(1- P(Side effect)) + 0.5*0.2

= 0.95*0.8 + 0.5*0.2

= 0.76+0.1

= 0.86

2-65 Answer

P(Open) = 0.9

P(Green | open)=0.98

P(Green | not open) = 0.05

P(Green)= P(Green|open)*P(Open) + P(Green|not open)*P(not open)
= 0.98*0.9 + 0.05*0.1=0.887

P(Open | green) = P(Green|open)*P(Open)/P(Green)
= (0.98*0.9)/0.887
=0.994

2-69 Answer

P(success I actual success) =0.75

P(success I actual not success)=0.15

P(actual success)=0.6

P(not actual success) = 0.4

P(success)= P(success I actual success)*P(actual success)+P(success I actual not success)* P(not actual success)
= 0.75*0.6+0.15*0.4
= 0.51

P(actual success I success)= P(success I actual success) *P(actual success)/P(success)

= 0.75*0.6)/0.51 =0.882

2-73 Answer

$P(A) = 0.4$

$P(B) = 0.3$

$P(A \cap B) = 0.1$

$P(AUB) = P(A) + P(B) - P(A \cap B)$

$= 0.4+0.3-0.1$

$= 0.6$

2-79 Answer

P(Engineering Quality)=0.35

P(Sporty design)=0.5

P(Engineering Quality ∩ Sporty Design) = 0.25

(.35)(.50) = .175 != 0. 25,

P(Engineering Sporty design) is not equal to the product of individual probabilities, therefore the events are not independent

2-86 Answer

P(success I favourable conditions) =0.55

P(success I neutral conditions) =0.3

P(success I unfavourable conditions) =0.10

P(Favourable)=0.6

P(Neutral)=0.2

P(Unfavourable)=0.2

P(Success) = 0.55*0.6 + 0.3*0.2+0.1*0.2

= 0.41

2-105 Answer

P(A)=0.26. P(B)=0.38 P(C)=0.36

P(defective I A)=0.08

P(defective I B)=0.05

P(defective I C)=0.04

P(defective)=0.08*0.26+0.38*0.05+0.36*0.04 = 0.0542

P(A I defective) =(0.08*0.38) / (0.0542)

= 0.56

THANKS(Muchas Gracias!!!)