Insights to prices & demographics of resale flats in Singapore

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NSDAI/01

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Datasets used

- 1. resale-flat-prices-based-on-registration-date-from-jan-2017-onwards.csv
  - *Link: https://data.gov.sg/dataset/resale-flat-prices*

- 2. age-of-hdb-resident-population-by-geographical-distribution.csv
  - *Link: https://data.gov.sg/dataset/sample-household-survey-hdb-resident-population-by-geographical-distribution*

- 3. gender-composition-of-hdb-resident-population-by-ethnic-group.csv
  - *Link: https://data.gov.sg/dataset/gender-composition-of-hdb-resident-population-by-ethnic-group-and-flat-type*

- 4. labour-force-participation-rate-of-hdb-resident-population-by-flat-type.csv
  - *Link: https://data.gov.sg/dataset/labour-force-participation-rate-for-hdb-population-by-ethnic-group-and-flat-type*
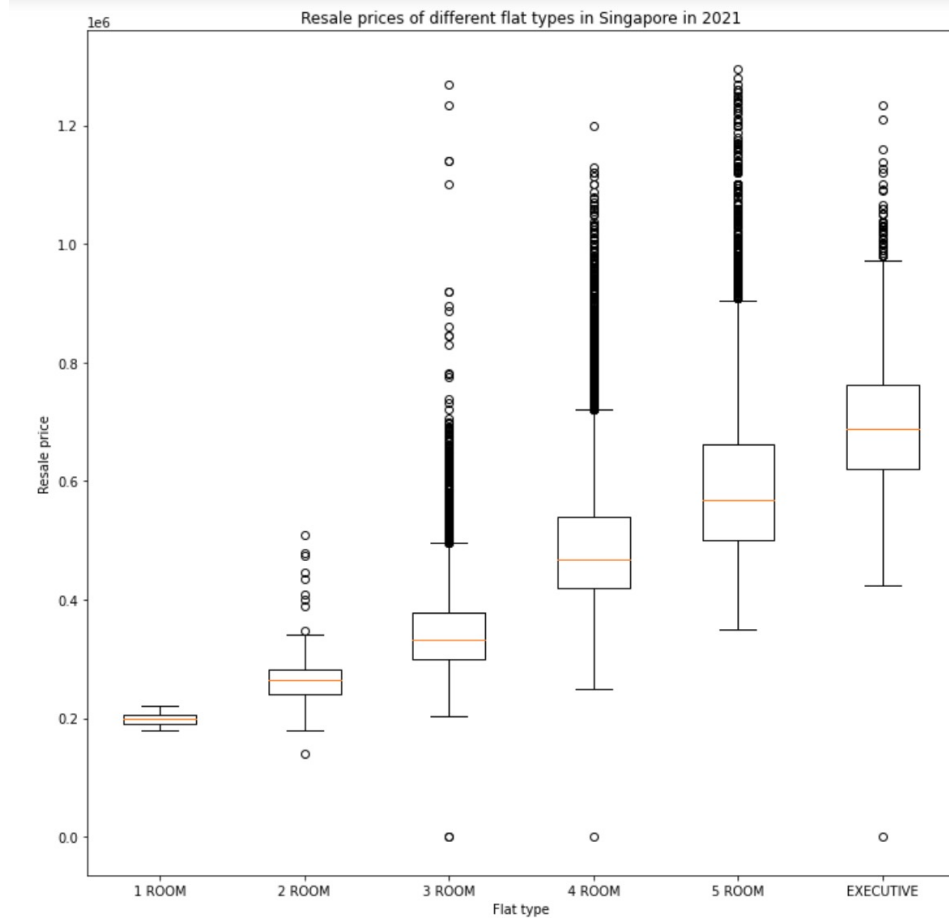
1. resale-flat-prices-based-on-registration-date-from-jan-2017-onwards.csv

- Includes details such as month, town, flat type, block, street name, storey range, floor area (in sqm), flat mode, lease commence date, remaining lease, resale price

| A	B	C	D	E	F	G	H	I	J	K
month	town	flat_type	block	street_name	storey_range	floor_area_sqm	flat_model	lease_commence_date	remaining_lease	resale_price
2017-01	ANG MO KIO	2 ROOM	406	ANG MO KIO AVE 10	10 TO 12	44	Improved	1979	61 years 04 months	232000
2017-01	ANG MO KIO	3 ROOM	108	ANG MO KIO AVE 4	01 TO 03	67	New Generation	1978	60 years 07 months	250000
2017-01	ANG MO KIO	3 ROOM	602	ANG MO KIO AVE 5	01 TO 03	67	New Generation	1980	62 years 05 months	262000
2017-01	ANG MO KIO	3 ROOM	465	ANG MO KIO AVE 10	04 TO 06	68	New Generation	1980	62 years 01 month	265000
2017-01	ANG MO KIO	3 ROOM	601	ANG MO KIO AVE 5	01 TO 03	67	New Generation	1980	62 years 05 months	265000
2017-01	ANG MO KIO	3 ROOM	150	ANG MO KIO AVE 5	01 TO 03	68	New Generation	1981	63 years	275000
2017-01	ANG MO KIO	3 ROOM	447	ANG MO KIO AVE 10	04 TO 06	68	New Generation	1979	61 years 06 months	280000
2017-01	ANG MO KIO	3 ROOM	218	ANG MO KIO AVE 1	04 TO 06	67	New Generation	1976	58 years 04 months	285000
2017-01	ANG MO KIO	3 ROOM	447	ANG MO KIO AVE 10	04 TO 06	68	New Generation	1979	61 years 06 months	285000
2017-01	ANG MO KIO	3 ROOM	571	ANG MO KIO AVE 3	01 TO 03	67	New Generation	1979	61 years 04 months	285000
2017-01	ANG MO KIO	3 ROOM	534	ANG MO KIO AVE 10	01 TO 03	68	New Generation	1980	62 years 01 month	288500
2017-01	ANG MO KIO	3 ROOM	233	ANG MO KIO AVE 3	10 TO 12	67	New Generation	1977	59 years 08 months	295000
2017-01	ANG MO KIO	3 ROOM	235	ANG MO KIO AVE 3	04 TO 06	67	New Generation	1977	59 years 08 months	295000
2017-01	ANG MO KIO	3 ROOM	219	ANG MO KIO AVE 1	07 TO 09	67	New Generation	1977	59 years 06 months	297000
2017-01	ANG MO KIO	3 ROOM	536	ANG MO KIO AVE 10	07 TO 09	68	New Generation	1980	62 years 01 month	298000
2017-01	ANG MO KIO	3 ROOM	230	ANG MO KIO AVE 3	04 TO 06	67	New Generation	1978	60 years	298000
2017-01	ANG MO KIO	3 ROOM	570	ANG MO KIO AVE 3	10 TO 12	67	New Generation	1979	61 years 04 months	300000
2017-01	ANG MO KIO	3 ROOM	624	ANG MO KIO AVE 4	04 TO 06	68	New Generation	1980	62 years 08 months	301000
2017-01	ANG MO KIO	3 ROOM	441	ANG MO KIO AVE 10	07 TO 09	67	New Generation	1979	61 years	306000
2017-01	ANG MO KIO	3 ROOM	625	ANG MO KIO AVE 9	04 TO 06	68	New Generation	1980	62 years 08 months	312000
2017-01	ANG MO KIO	3 ROOM	119	ANG MO KIO AVE 3	07 TO 09	67	New Generation	1978	60 years 10 months	312000
2017-01	ANG MO KIO	3 ROOM	255	ANG MO KIO AVE 4	04 TO 06	73	New Generation	1977	59 years 06 months	321000
2017-01	ANG MO KIO	3 ROOM	432	ANG MO KIO AVE 10	10 TO 12	67	New Generation	1979	61 years	325000
2017-01	ANG MO KIO	3 ROOM	211	ANG MO KIO AVE 3	01 TO 03	67	New Generation	1977	59 years 03 months	325000
2017-01	ANG MO KIO	3 ROOM	584	ANG MO KIO AVE 3	04 TO 06	67	New Generation	1979	61 years 05 months	328000
2017-01	ANG MO KIO	3 ROOM	118	ANG MO KIO AVE 4	07 TO 09	74	New Generation	1978	60 years 04 months	330000
2017-01	ANG MO KIO	3 ROOM	333	ANG MO KIO AVE 1	07 TO 09	68	New Generation	1981	63 years	330000
2017-01	ANG MO KIO	3 ROOM	256	ANG MO KIO AVE 4	10 TO 12	73	New Generation	1977	59 years 06 months	335000
2017-01	ANG MO KIO	3 ROOM	330	ANG MO KIO AVE 1	07 TO 09	68	New Generation	1981	63 years	338000
2017-01	ANG MO KIO	3 ROOM	557	ANG MO KIO AVE 10	10 TO 12	82	New Generation	1980	62 years	366000
2017-01	ANG MO KIO	3 ROOM	302	ANG MO KIO AVE 3	10 TO 12	73	New Generation	1978	60 years 03 months	373000
2017-01	ANG MO KIO	3 ROOM	575	ANG MO KIO AVE 10	07 TO 09	82	New Generation	1980	62 years	375000
2017-01	ANG MO KIO	3 ROOM	509	ANG MO KIO AVE 8	01 TO 03	81	New Generation	1980	62 years 05 months	390000
2017-01	ANG MO KIO	4 ROOM	472	ANG MO KIO AVE 10	10 TO 12	92	New Generation	1979	61 years 06 months	400000
2017-01	ANG MO KIO	4 ROOM	475	ANG MO KIO AVE 10	07 TO 09	91	New Generation	1979	61 years 06 months	400000

Objectives

- To find out the latest resale prices (in the last 12 months – i.e. 2021-01 onwards) of different towns / flat types

- To compare and gauge which town is a more affordable option to live in, for a specific flat type (e.g. 4 room flat)

- *Peculiarities – When trying to derive the mean/median values, 'NaN' values sometimes show up in the dataset, which causes errors when trying to plot the charts.*
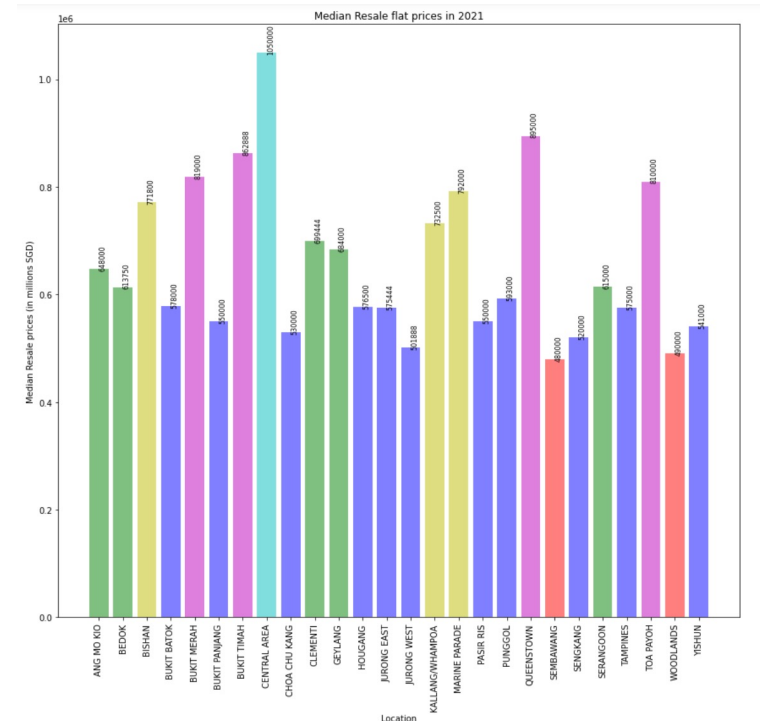
Graph 1.1 – Boxplot of resale prices of various flat types in 2021 - Process

- Data was filtered to show only 2021 values of each flat type
- Numpy arrays of resale prices are created respectively based on different flat types
- Boxplots are then created using matplotlib function – plt.boxplot, where the x-axis shows the flat types, and y-axis shows the resale prices in 2021.

Resale prices of different flat types in Singapore in 2021

Graph 1.1 – Boxplot of resale prices of various flat types in 2021 - Insights

- As there are many outliers especially for 3 Room, 4 Room, 5 Room and executive flats, the median price of the resale flats would be a better gauge of the general resale prices of various flat types in 2021.

- Overall, 5 room flat prices seems to have the highest variability, as seen from the length of its box plot.

- The outlier may be caused by extreme house prices especially in the more popular districts.

Resale prices of different flat types in Singapore in 2021
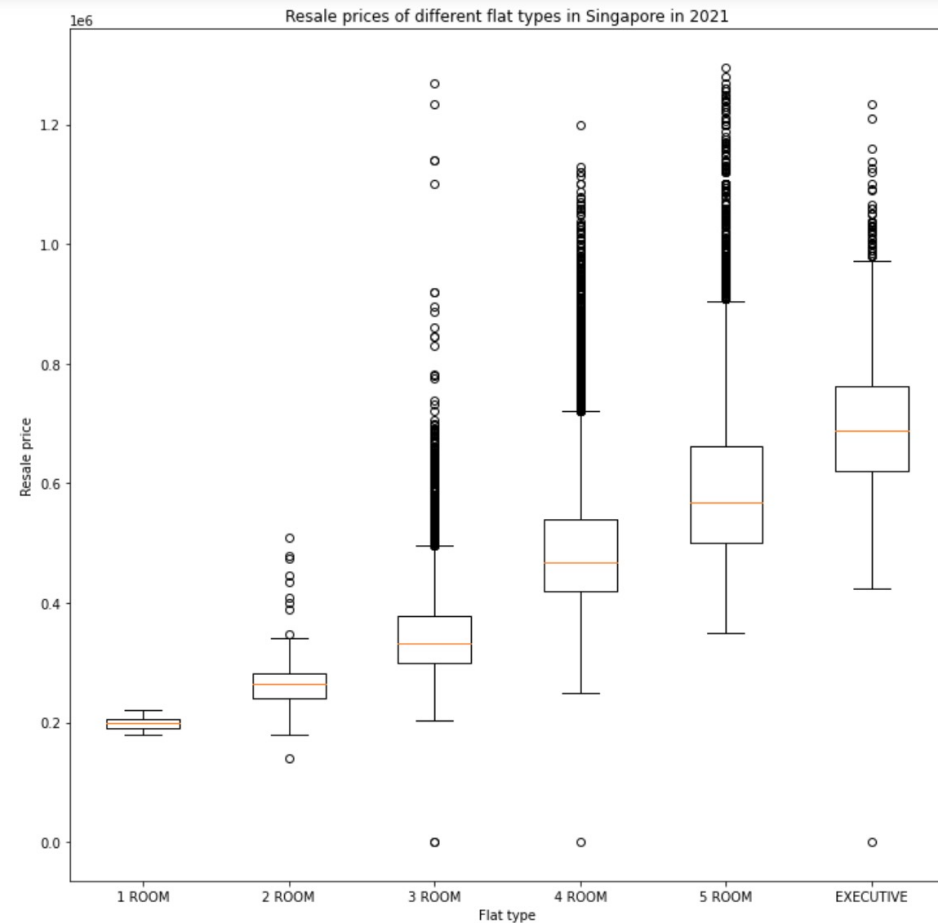
Graph 1.2 – Bar chart of resale prices of various locations for 5 room flats in 2021 - Process

- Data was filtered to show only 2021 values of each location.

- Data was also filtered to only include 5 room flat values

- Np.median was used to derive the median prices of resale flats per location in 2021

- Bar charts are then created using matplotlib function – plt.bar, where the x-axis shows the location, and y-axis shows the median resale prices in 2021.

- Colors of the bar chart are categorized based on the values of its resale price, using the 'if-else' function

# Graph 1.2 – Bar chart of resale prices of various locations for 5 room flats in 2021 - Insights

- Central areas have the highest median resale prices, whilst Sembawang has the lowest median resale prices in 2021.

- In general, most of the resale flat median prices range between SGD500,000 to SGD600,000 for a 5 room flat (as seen from the highest occurrence of the dark purple bars in the plot)

- It seems that the higher-priced districts are usually the ones closer to central areas (e.g. queenstown, toa payoh etc)
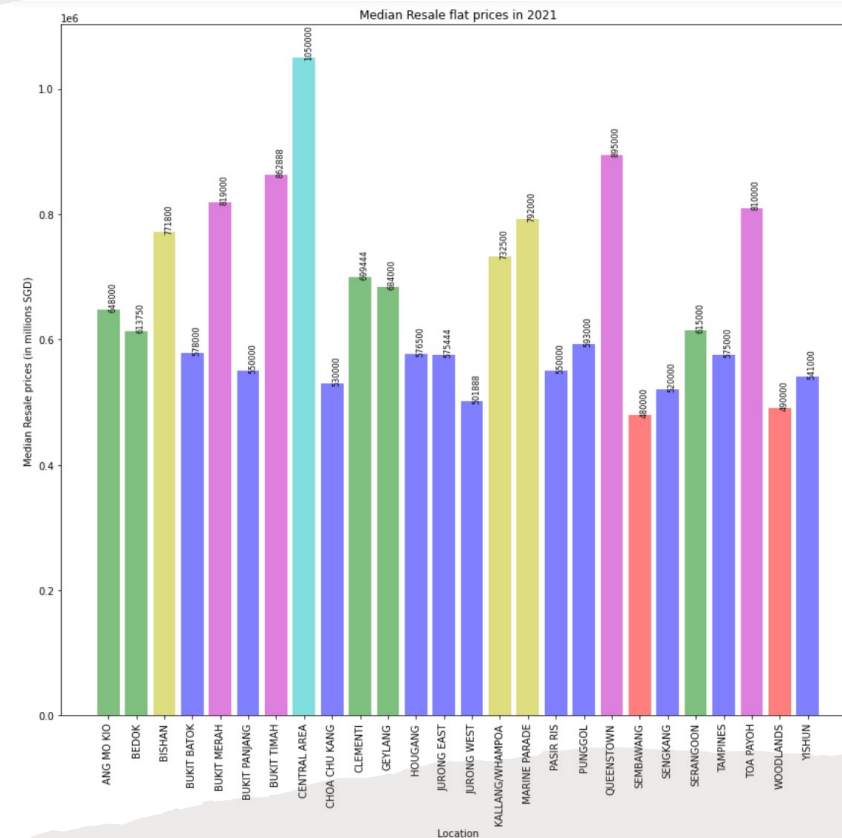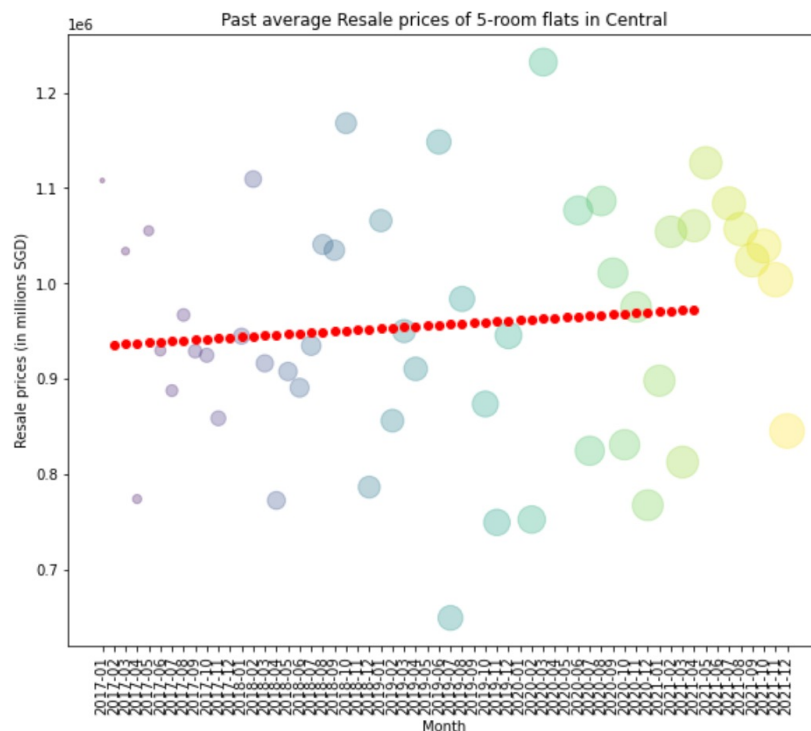
Graph 1.3 – Scatterplot of resale prices of 5 room flats in central area - Process

- Data was filtered to show values of average resale prices of 5 room flats in central areas.

- Np.mean was used to derive the mean prices of resale flats of 5 room flats in central

- Scatterplots are then created using matplotlib function – plt.scatter, where the x-axis shows the month, and y-axis shows the mean historical resale prices.

- Color style – 'viridis' is then applied to the scatterplot to enhance the visualization of the chart.

- A trend line is also added to show the general trend in prices of 5 room flats in Central areas over the period.
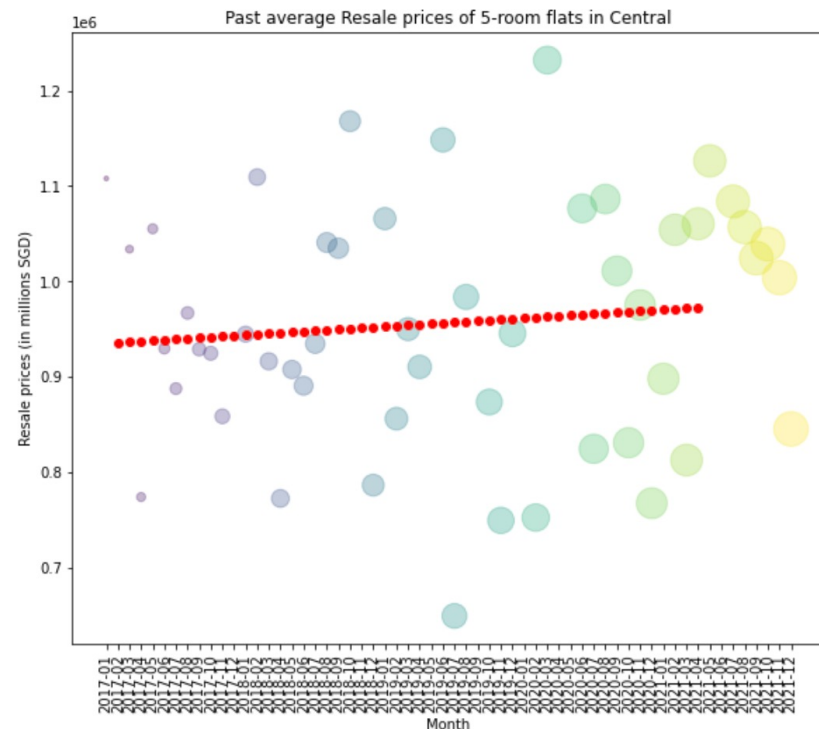
Graph 1.3 – Scatterplot of resale prices of 5 room flats in central area - Insights

Past average Resale prices of 5-room flats in Central

- Prices in general ranged between SGD 700,000 to SGD 1,200,000. Most of the average prices were between SGD 900,000 to SGD 1,100,000. One can expect to pay this range of price to purchase a 5-room flat in central area.

- Generally, there was a slight positive increase in prices of 5 room flats in central areas over the period.

Graph 1.4 – Line plot of Average prices of 4 room flats in Ang Mo Kio/Bishan/Toa Payoh/Kallang/Whampoa - Process

Past average Resale prices of 4-room flats in Ang Mo Kio, Bishan, Toa Payoh & Kallang/Whampoa
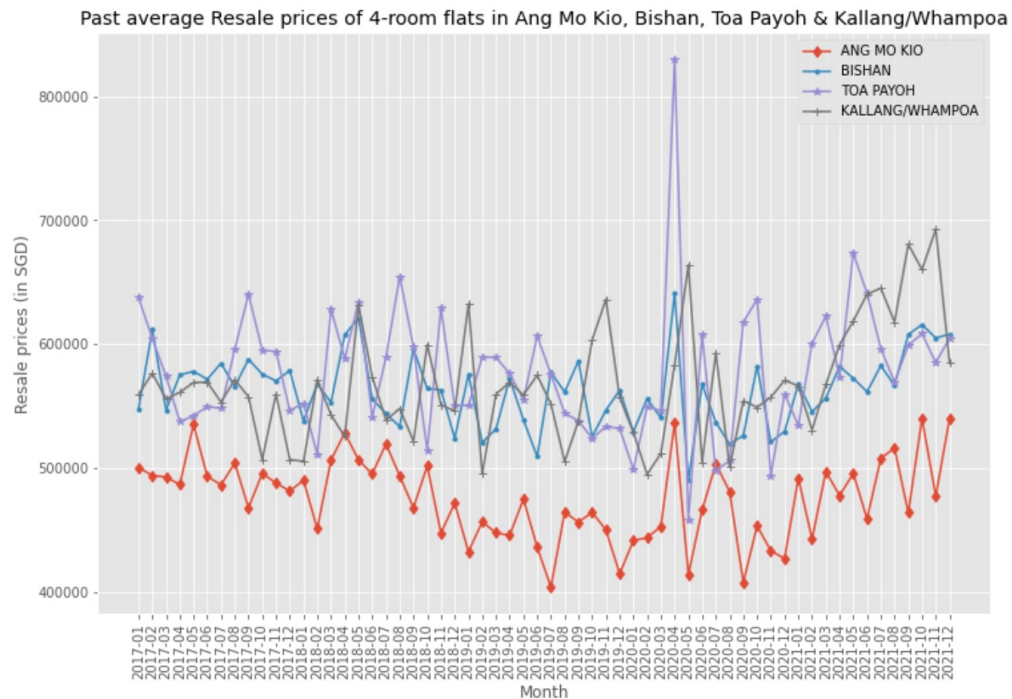
- Data was filtered to show values of average resale prices of 4 room flats in central areas.

- Np.mean was used to derive the mean prices of resale flats of these locations

- Lineplots are then created using matplotlib function – plt.plot, where the x-axis shows the month, and y-axis shows the mean historical resale prices.

- Legends are included to clearly identify the trend of resale prices of each specified location.

- Different markers are added for different charts for easier visualization.

- 'ggplot' style was also used in this chart to improve the visualization

Graph 1.4 – Line plot of Average prices of 4 room flats in Ang Mo Kio/Bishan/Toa Payoh/Kallang/Whampoa - Process

- Overall, prices have been fluctuating over the period, and it is evident that house resale prices seemed to be at its peak during the early to mid 2020 period. This was probably due to the rise in demand for housing during the start of covid period.

- This chart would be useful for a buyer considering a 4 room flat in a few locations, to identify how resale prices have been over the period, as well as deciding which area would be the most affordable option.

- Flats around Bishan, Toa Payoh and Kallang/Whampoa seems to have similar resale prices. Ang Mo Kio flats are more affordable as compared to the other 3 options.

Past average Resale prices of 4-room flats in Ang Mo Kio, Bishan, Toa Payoh & Kallang/Whampoa
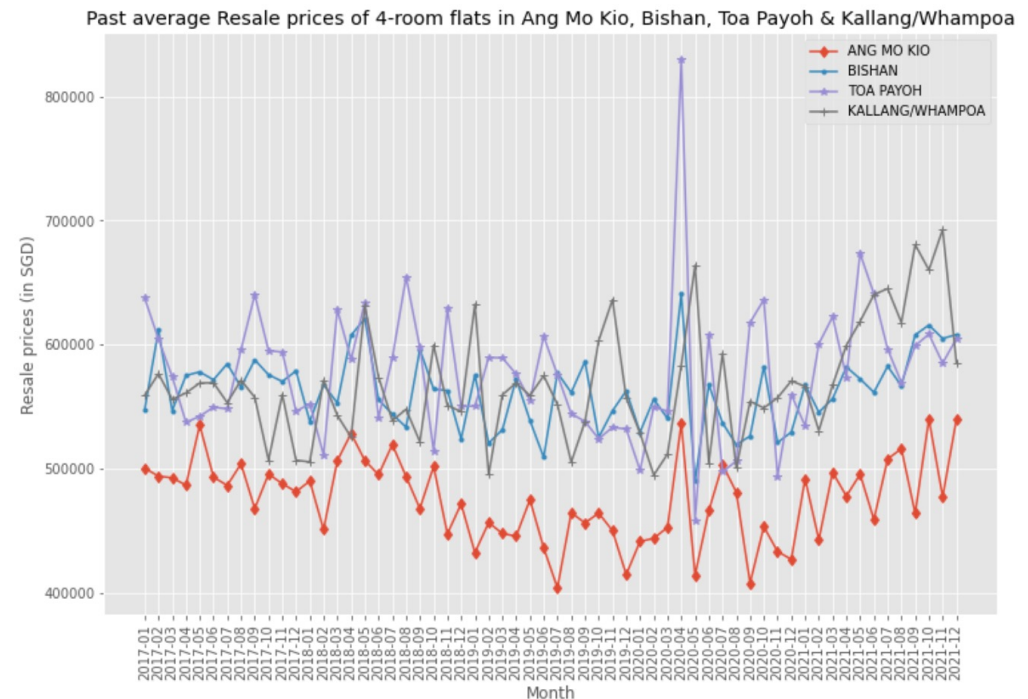
2. age-of-hdb-resident-population-by-geographical-distribution.csv

shs_year	town_estate	age_group	percentage
2013	Sengkang	Below 15	24
2013	Sengkang	15 - 24	11.6
2013	Sengkang	25 - 34	13.4
2013	Sengkang	35 - 44	19.6
2013	Sengkang	45 - 54	16.4
2013	Sengkang	55 - 64	9.9
2013	Sengkang	65 & Above	5.1
2013	Punggol	Below 15	25
2013	Punggol	15 - 24	8.6
2013	Punggol	25 - 34	19.3
2013	Punggol	35 - 44	22.1
2013	Punggol	45 - 54	12.2
2013	Punggol	55 - 64	8
2013	Punggol	65 & Above	4.8
2013	Sembawang	Below 15	21.7
2013	Sembawang	15 - 24	14
2013	Sembawang	25 - 34	15.7
2013	Sembawang	35 - 44	19.7

- Includes details such as shs_year, town_estate, age_group, percentage
- Objective: To identify the age group distribution in comparison with other age group distributions easily based on the color intensity.

Graph 2 – Heatmap of age distribution in various towns - Process

- Data has been filtered to only include 2018 values

- Heatmap is created using plt.imshow, showing different colors based on the values of % of distribution. i.e. color goes from lightest to darkest shade of blue as the % increases.

- A color bar has been situated at the right hand side of the chart as a general guide to the varying colors based on the % of distribution.

Age of hdb resident population by geographical distribution (in %)
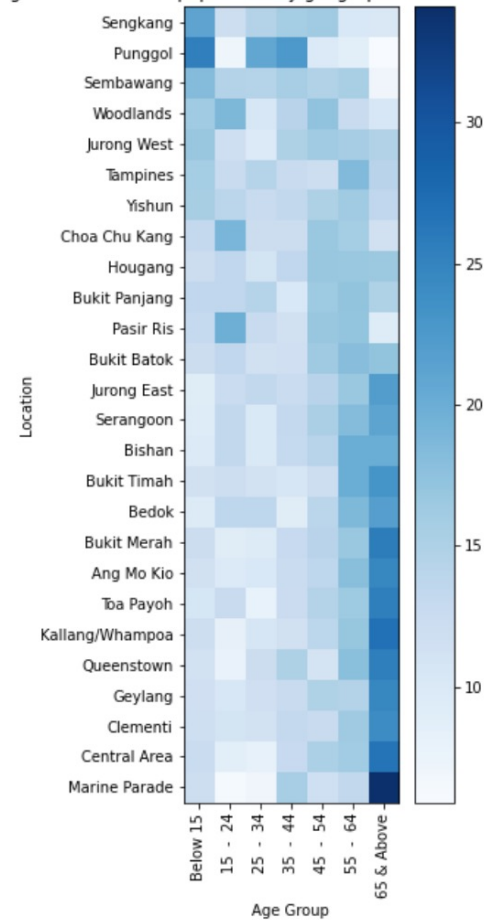
Graph 2 – Heatmap of age distribution in various towns - Insights

Age of hdb resident population by geographical distribution (in %)
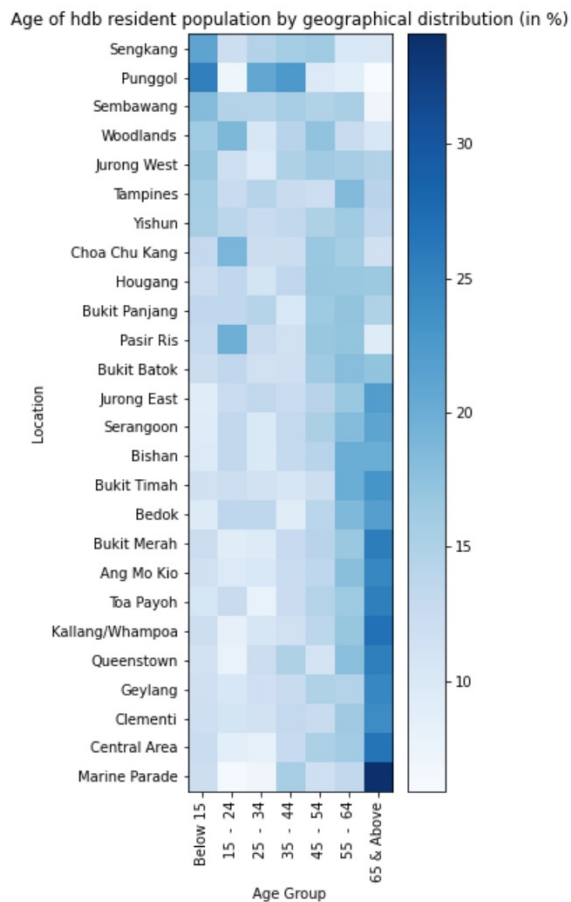
- Heatmap is an easy and useful illustration to identify which town and has the highest % of which age group and vice versa.

- For instance, Marine Parade has the highest number of residents whom are 65 and above, whilst Punggol seems to have the lowest number of residents aged between 15 to 24.

- Somehow, the denser/darker colors come mostly from the age group of 65 & above, which may imply that Singapore is facing an aging population situation.

3. gender-composition-of-hdb-resident-population-by-ethnic-group

- Includes details such as shs_year, ethnic_group, gender, percentage
- Objective: To identify the gender composition based on different races staying in HDB flats

shs_year	ethnic_group	gender	percentage
2008	Chinese	Male	49.7
2008	Chinese	Female	50.3
2008	Malay	Male	48.8
2008	Malay	Female	51.2
2008	Indian	Male	49.1
2008	Indian	Female	50.9
2008	Others	Male	47.8
2008	Others	Female	52.2
2008	All	Male	49.4
2008	All	Female	50.6
2013	Chinese	Male	49.1
2013	Chinese	Female	50.9
2013	Malay	Male	48
2013	Malay	Female	52
2013	Indian	Male	49.2
2013	Indian	Female	50.8
2013	Others	Male	42.2
2013	Others	Female	57.8
2013	All	Male	48.8

Graph 3 – Pie chart of gender composition of hdb-resident population by ethnic group - Process
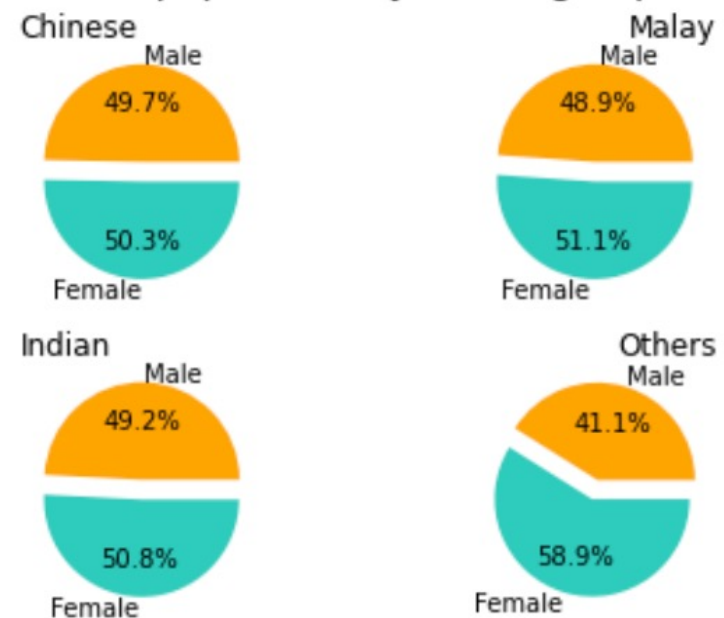
- Data has been filtered to only include 2018 values

- Numpy arrays are then created accordingly to store values based on different races.

- Piecharts are created by defining subplots, and using ax.pie, to show percentages of males and females in different races whom are staying in HDBs.

- Titles of the labels and colors of the pie chart are added to enhance the visualization, making it easier to interpret the values of the dataset.

Gender composition of hdb resident population by ethnic group in 2018
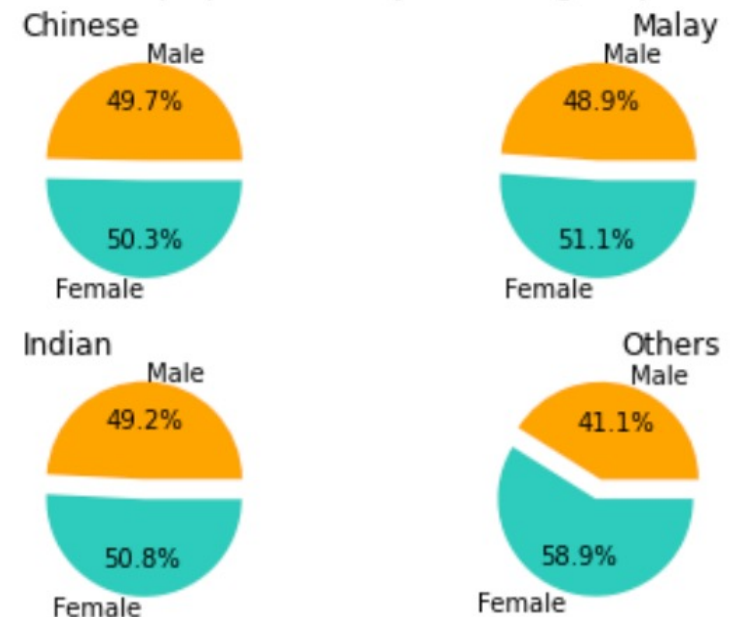
Graph 3 – Pie chart of gender composition of hdb-resident population by ethnic group - Insights

- In general, there are more females than males staying in HDBs.

- Proportion of males to females staying in HDBs is relatively constant across all races (~50+% females, 40+% males)

Gender composition of hdb resident population by ethnic group in 2018

Chinese
Male 49.7%
Female 50.3%

Malay
Male 48.9%
Female 51.1%

Indian
Male 49.2%
Female 50.8%

Others
Male 41.1%
Female 58.9%

4. labour-force-participation-rate-of-hdb-resident-population-by-flat-type

- Includes details such as shs_year, flat_type, gender, lfpr
- Objective: To identify the labor force participation rate (lfpr) based on different flat types.

shs_year	flat_type	gender	lfpr
2008	1-room	Male	66.9
2008	1-room	Female	42.6
2008	1-room	All	55.7
2008	2-room	Male	69.5
2008	2-room	Female	43.3
2008	2-room	All	55.9
2008	3-room	Male	75.6
2008	3-room	Female	51.8
2008	3-room	All	63.2
2008	4-room	Male	75.8
2008	4-room	Female	52.7
2008	4-room	All	64.2
2008	5-room	Male	75.6
2008	5-room	Female	55.6
2008	5-room	All	65.4
2008	Executive	Male	75.8
2008	Executive	Female	55.1
2008	Executive	All	64.9

Graph 4 – Bar Chart of labour force participation rate of hdb resident population by flat type - Process

- Data has been filtered to only include 2018 values, and 3 numpy arrays have been created separately for 'Males', 'Females' and 'All' values.

- Bar chart is created using plt.bar, with the different categories stacked together horizontally using plt.subplots.

- Legends, titles and axis labels are also added for clarity.
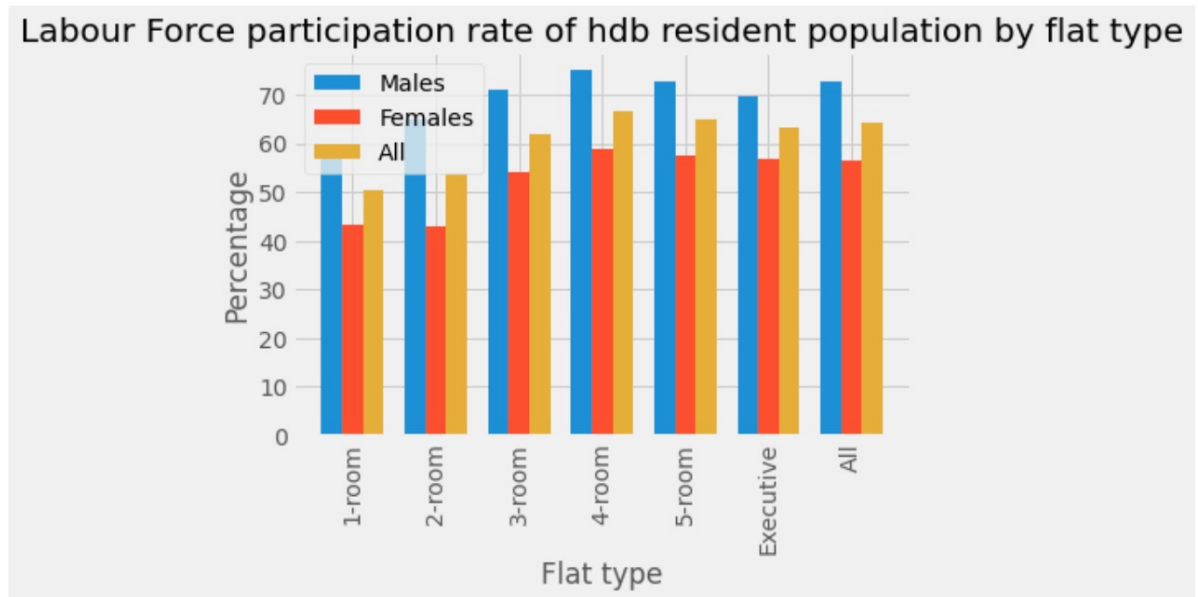
Graph 4 – Bar Chart of labour force participation rate of hdb resident population by flat type - Insights

Labour Force participation rate of hdb resident population by flat type
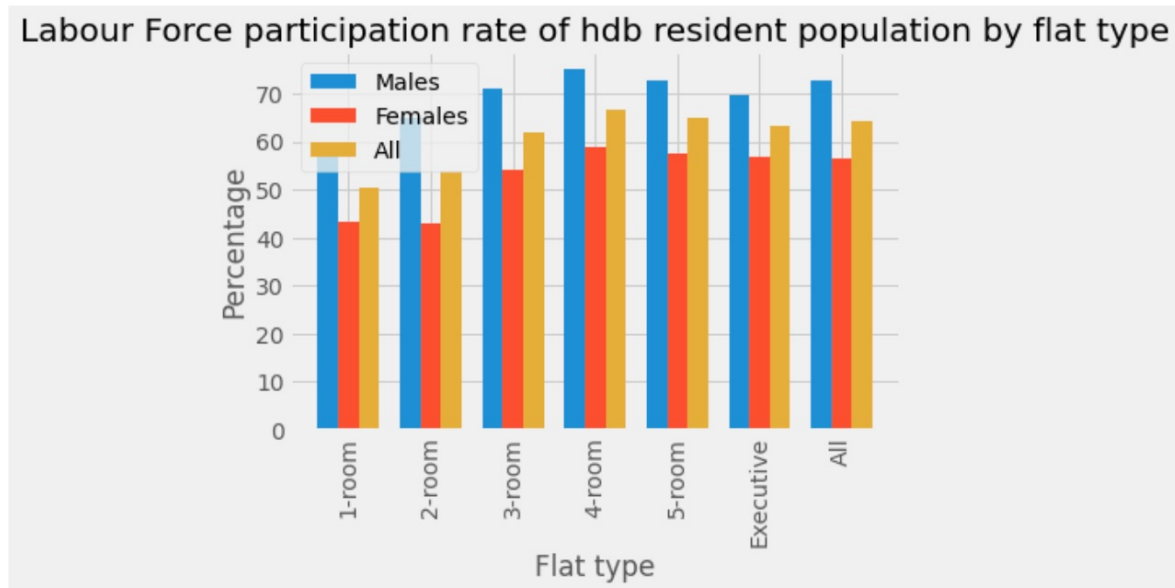
- In general, 1-room flat residents have the lowest labour force participation rates, whilst 4-room flat residents have the highest labour force participation rates.

- There are more males than females in the labour force

- The labour force participation rate seemed relatively similar for residents staying in 3-room, 4-room, 5-room and executive flats.

THE END