**Business Stats with Python**

**CA3 Individual Assignment**

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# Task 1

Singapore is one of the most successful country. Why? There is a great level of trust in our society in Singapore. Every individual has done their own part as a responsible citizen. Individuals trusted the government’s decisions. The government is open and transparent, they communicated directly to the citizen, shared information quickly. Despite the inconvenience, residents patiently endured cycles of relaxing and tightening policies.

Singapore has gained many different sorts of achievements as a result of this mutual trust between citizens and the government. However, there are significant geopolitical and economic obstacles in Singapore, and the Singaporean leader must have several solutions in order for Singapore to preserve its position in Asia over the next decade.

## Singapore’s achievements

1. **Education System**

Singapore is rank 1 for education, with a score of 9.10 out of 10 (FE News, 2021). Singapore had invested so much in education, whereas countries such as Russia had invested heavily in weaponry. Singapore have a pool of outstanding teachers as the ministry of education is very selective. They are exposed to evaluations that examine the quality of their instruction. Especially when instructors in Singapore receive good monthly salary, it encourages teaching talent to join the Ministry of Education. A high caliber of well-trained instructors would develop a strong feeling of learning in schools and assure high-quality courses

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1. **Healthcare**

Singapore offers Asia's top medicine and public healthcare system. The Ministry of Health (MOH) is committed to providing basic medical services that are both high-quality and affordable to all citizens.. It also offers high-quality services and is quite efficient. Primary care in government hospitals is significantly subsidized, and in some cases free, for Singaporeans and permanent residents (PRs), with more luxurious care in private rooms charging an additional fee.

1. **Smart City**

As Singapore has made major investments in improving mobile payment alternatives, the share of customers using mobile payments has increased dramatically in recent years, rising from 34% in 2018 to 46% in 2019. This figure is expected to climb more as smartphones and payment technologies evolve. (O-City by bpc). As it works toward this goal, the city-state is depending on digitalization and the development of an efficient public transportation network.

## Geo-political and economic challenges

There are many geo-political and economic challenges in Singapore this year.

An example is a Covid-19 pandemic.

Covid-19 affected the tourism-related sector and the business in Singapore severely. In our struggle against COVID-19, we've gone a long way. Singapore are now figuring out how to live with the virus. They have handled the impact of each infectious wave better than most country. In most country, when a wave occur the number of covid cases rocket up fiercely, the wave will occur unexpectedly like a roller coaster. This puts hospitals and governments under a lot of stress. However, during the Covid 19 pandemic in 2020, over 20,000 migrant laborers were quarantined as a result of numerous clusters in these dorms. Migrant laborers make significant contributions to Singapore. These migrant laborers construct our houses, offices, and roadways. They help Singapore to be clean and functional. They produce commodities that are utilized domestically and traded internationally. Low-wage temporary migrant laborers are therefore critical to the functioning of Singapore society.

## 3 ways what the leaders of sg should do to maintain its status

1. **Selecting a good leader**

It is critical to select the proper leaders in order for the Country to be successful. There are 2 types of leaders. One who shows a good example to others and listen to the citizen’s voices, and one who abuses their power. The leaders of Singapore have done a great job so far in making Singapore one of the most developed countries in the world. They should continue to prioritize the selection of the appropriate leader.

1. **Maintains its security**

Singapore is one of the world's safest countries. For starters, because the little island is heavily watched, it is quite simple to get caught. Second, the punishments are kept under wraps. Maintaining its security allows citizens to feel safe and at ease in their surroundings. Few residents will wish to relocate to another country. As a result, Singapore's authorities must continue to ensure the country's security.

1. **Having Strict Laws**

Singapore should continue to establish strict laws, to maintain the order of the country. The laws must be properly followed by both locals and outsiders. Singapore society is heavily controlled due to the criminalization of various actions under Singapore Laws. An example, of Singapore’s strict laws is chewing gum is not allowed in the Country. It can minimize the problem of litter and minimize the high expenses associated with cleaning up the trash. Singapore was placed 17th out of 139 nations in terms of rule of law.(Washington DC 2021)

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# Task 2

The Secretary-General of the National Trades Union Congress (NTUC) has selected me as the head of the Employment and Pay Equity Taskforce to investigate the severity of the pay gap. The sample for study consisted of 968 full-time employees aged 25 to 60.

## The central tendency, dispersion, and salary distribution for all 3 types of workers.

I had calculated the monthly salaries of three different categories of workers.

Table

Description automatically generatedComparing the three different type of workers in terms of **central tendency**, **dispersion**, and **salary distribution form**.

**Central Tendencies**

**Range:** The Summary Descriptive Statistic shows that Singaporeans and EP-holder have a wide range of monthly salaries.

**Standard Deviation**: However, Other permit holders have the lowest Standard deviation, the data is clustered closely around the mean, it is more consistent.

**Sample Variance**: Other permit holders also have the lowest Sample Variance, the monthly salaries data are very close to the expected value.

**Dispersion**

**Mean**: Singaporeans’ average salaries is higher than other workers.

**Median**: Singaporeans have the highest median, indicating that Singaporean monthly salary is the highest.

**Mode**: Singaporeans have the highest mode of $9780.

**Salary Distribution Form**

Singaporeans’ monthly salary mean and median is almost equivalent, it have a **symmetric salary distribution**.

EP holder’s monthly salary histogram has 2 peaks, it has a **non-symmetric bimodal distribution.**

Other work permit holders mean is less than its median, it has **a left-skewed distribution**

## Histogram of the monthly salaries of 3 different types of worker.

Singaporean histogram has a range from $3,262 to $12,219, it have a bin width of 1000. it have a **symmetric salary distribution**.

EP-holder histogram has a range from $ 3,514 to $12,991, it have a bin width of 1000. it has a **non-symmetric bimodal distribution**

Other work pass-holder histogram has a range from $1,506 to $5,207, it have a spread of 370. it has **a left-skewed distribution**

Chart, histogram

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## The discrimination in the labor market basis on education, gender, and experience.

**Discrimination in the labor market arises when people with equal labor market qualities are paid differently**.

**Singaporeans**

Chart

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There is discrimination between Singaporeans.

As **the scatter graph** for education level shows, Singaporeans with a lower degree level earn less than those with a degree.

The highest pay for a Singaporean with a degree is roughly $13,000, whereas the maximum compensation for a Singaporean with a lesser degree is $8,000.

According to the experience scatter graph, persons with less than two years of experience earn less than the rest.

The gender scatter graph indicates that the female minimum and maximum wage is greater than the male.

Hence, there is discrimination between Singaporeans

Graphical user interface

Description automatically generated**EP-holder**

Yes, there is prejudice against EP holders as well.

Those with a degree have a greater maximum and minimum wage in the **education level scatter** graph than those with a lower degree.

**The experience scatter graph** illustrates that people with less than two years of experience get paid less.

As a result, there is also prejudice among EP holders.

## 95% confidence interval around the mean monthly salary of Singaporean and EP-holder.

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Diagram

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Confidence Interval Formula🡪

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## Is the media correct about the mean monthly salary of Singaporeans being $7,900?

According to media reports, the average monthly pay in Singapore is S$ 7,900. Lets test whether the media is correct that the mean is $7,900.

H0: ≠ 7900 Rejection region, Critical value= 1.491

H1: = 7900 Test Static= 73.141

T= 73.141 > 1.491

Since**, test statistic = 73.141 > 1.491**, we reject the null hypothesis.

There is insufficient evidence to show that the media reports are correct, about the average monthly pay in Singapore is S$ 7,900, at a 0.05 significance.

## Is the population mean monthly salary different between EP-holders and Singaporean workers?

Singaporeans and EP-holder is significantly different as their population mean monthly salary are different by $248.31. To compute the population mean, sum all salaries and divide by the total number of Singaporeans/ EP-holders.

**Singaporeans** have a sum salary of $ 2849469. Total number of Singaporeans is 361.

The population mean monthly salary for Singaporeans is $7893.27

**EP-holder** have a sum salary of $1620730. Total number of EP-holder is 212.

The population mean monthly salary for EP-holder is $7644.95.

Singaporeans have a higher monthly salary than EP-holders by $248.31. Assuming that gender, experience, age and education is not taken into consideration.

## Predict Mary’s Salary

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Description automatically generatedMary is 38 years old, with an Employment Pass holder who has worked as a scientist at A\*STAR for 11 years, predicts her monthly pay.

Prediction salary= $7,970

**Conclusion**

After central tendency, dispersion, and salary distribution for all 3 types of worker, I could tell that Singaporeans have the most monthly salary. However, the monthly salary of Other permit holders have the lowest standard deviation, indicating that the monthly salary value is more consistent. There is discrimination in the labour market basis on education, gender and experience. Those who have a degree, is a female and  have more experience earn the most. EP-holders have a higher confidence level(95%) and it have a bigger range than Singaporeans mean salary. There is insufficient evidence to show that the media reports are correct, about the average monthly pay in Singapore is S$ 7,900, at a 0.05 significance. Singaporeans have a higher monthly salary than EP-holders by $248.31. Assuming that gender, experience, age and education is not taken into consideration.

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