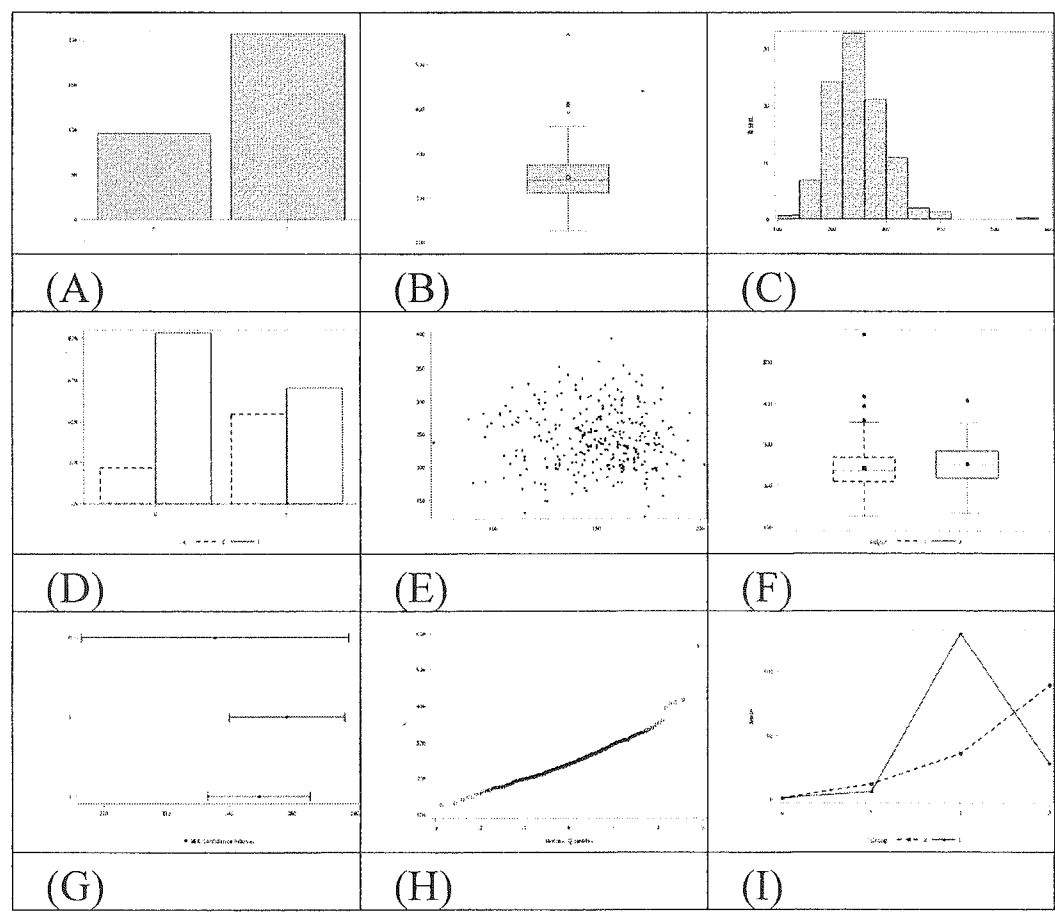


國立臺北大學 111 學年度碩士班一般入學考試試題

系（所）組別：都市計劃研究所甲組、乙組
科 目：統計學

第1頁 共4頁
☒可 ☐不可使用計算機

1. (25%) Consider a data for investigating the housing price (unit: thousand dollars) in an area. Five attributes were collected including the location (metropolitan area, urban and suburban), floor size (units: feet), distance to the metro station (units: kilometer), number of bathrooms (1, 2, 3) and having the balcony (yes and no). Exploratory data analysis (EDA) is an important statistical analysis procedure. Data visualization is one of the EDA. The following provides common used statistical figures:



Use the letters A – I to answer the following questions. **Multiple** figures might be possible for the following questions.

- (i) Write down the appropriate figures for visualizing distance to the metro station.
- (ii) Write down the appropriate figures for visualizing location.
- (iii) Write down the appropriate figures for visualizing location and housing price.
- (iv) Write down the appropriate figures for visualizing distance to the metro station and housing price.
- (v) Write down the appropriate figures for visualizing having balcony and the location.

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2. (20%) Consider a data for investigating the housing price (unit: thousand dollars) in an area. Five attributes were collected including the location (metropolitan area, urban and suburban), floor size (units: feet), distance to the metro station (units: kilometer), number of bathrooms (1, 2, 3) and having the balcony (yes and no). The first step for the data analyses is to compute descriptive statistics for each variables. The following provides common used summary statistics:

(A) Correlation	(B) Frequency	(C) Interquartile	(D) Kurtosis
(E) Mean	(F) Medium	(G) Minimum	(H) Mode
(I) Percent	(J) Skewness	(K) Standard deviation	(L) Variance

Use the letters A – I to answer the following questions. **Multiple** summary statistics might be possible for the following questions.

- (i) Write down the appropriate summary statistics for describing the centrality of the distance to the metro station.
 - (ii) Write down the appropriate summary statistics for describing the variability of the distance to the metro station.
 - (iii) Write down the appropriate summary statistics for describing the shape of the distribution of the distance to the metro station.
 - (iv) Write down the appropriate summary statistics for summarizing the location.
3. (15%) Consider a data for investigating the housing price (unit: thousand dollars) in an area. Five attributes were collected including the location (metropolitan area, urban and suburban), floor size (units: feet), distance to the metro station (units: kilometer), number of bathrooms (1, 2, 3) and having the balcony (yes and no). The second step for the data analyses is to find the bivariate association between housing price and other attributes. The following provides common used test statistics:

(A) One-Way Analysis of Variance (ANOVA)	(B) Correlation	(C) Chi-square test	(D) McNemar test
(E) Paired T test	(F) Simple linear regression	(G) Two independent sample T test	(H) Wilcoxon rank sum test

Use the letters A – I to answer the following questions. **Multiple** test statistics might be possible for the following questions.

- (i) Write down the appropriate test statistics for testing the association between the housing price and location.
- (ii) Write down the appropriate test statistics for testing the association between the housing price and the floor size.
- (iii) Write down the appropriate test statistics for testing the association between the housing price and having the balcony.

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4. (10%) Let X denote the housing price. Assume that the distribution of X approximately follows a normal distribution with mean 75 millions and standard deviation 100 millions.
- Find the probability that the housing price exceeds 90 millions.
 - Assume a businessman would like to know the reasonable housing price. He would like to conduct a study to collect a sample to estimate the mean housing price μ . Assume the standard deviation equals 100 millions. How large a sample is necessary if he want the estimate to be within 2 millions of the actual mean value μ , with 95% confidence?
5. (10%) Assume a regular condo price at a given area is about 100 thousand dollars. Suppose the probability that the condo price exceeds 150 thousand dollars is 0.1. Let X equal the number of condo prices that exceeds 150 thousand dollars in a sample of 30 condos selected at random from this area.
- Find $P[X = 1]$.
 - Find mean and variance of X .
6. (10%) The greatest variation in real estate price is in California, where recently there was a difference of more than \$1 million between a home in Palo Alto and one in Bakersfield. In Palo Alto, the typical four-bedroom, 2,200 square-foot house was appraised at about \$1.2 million in 2001, whereas a similar home in Bakersfield was appraised at \$200,000. Suppose that a realtor randomly sampled 50 homes in Palo Alto in 2002 and found a 95% confidence interval for the average appraised value of a home in Palo Alto to be 0.91 to 1.08 millions. Assume that the appraised values of homes in Palo Alto are normally distributed. Is there sufficient evidence to indicate that the average price μ of a home in Palo Alto is different from \$1.2 million in 2002?
- Write down the hypotheses.
 - Use a 5% significance level to make your inference.
7. (10%) Winthrop Boat Lines is exploring the possibility of offering a ferry service between the cities of Patna and Madura, provided there is sufficient demand to make it feasible. The firm randomly interviewed 210 commuters from the two cities, and 146 of them indicated they would patronize the ferry service instead of the present bus service.
- Estimate the population p of commuters from the two cities who would prefer the ferry service.
 - Construct a 95% confidence interval for p .

試題隨卷繳交

接背面

國立臺北大學 111 學年度碩士班一般入學考試試題

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第4頁 共4頁
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Table 1: Area under the standard normal curve

<i>z</i>	<i>P</i> [<i>Z</i> ≤ <i>z</i>]									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.00	0.500	0.504	0.508	0.512	0.516	0.519	0.523	0.527	0.531	0.535
0.10	0.539	0.543	0.547	0.551	0.555	0.559	0.563	0.567	0.571	0.575
0.20	0.579	0.583	0.587	0.591	0.594	0.598	0.602	0.606	0.610	0.614
0.30	0.617	0.621	0.625	0.629	0.633	0.636	0.640	0.644	0.648	0.651
0.40	0.655	0.659	0.662	0.666	0.670	0.673	0.677	0.680	0.684	0.687
0.50	0.691	0.695	0.698	0.701	0.705	0.708	0.712	0.715	0.719	0.722
0.60	0.725	0.729	0.732	0.735	0.738	0.742	0.745	0.748	0.751	0.754
0.70	0.758	0.761	0.764	0.767	0.770	0.773	0.776	0.779	0.782	0.785
0.80	0.788	0.791	0.793	0.796	0.799	0.802	0.805	0.807	0.810	0.813
0.90	0.815	0.818	0.821	0.823	0.826	0.828	0.831	0.834	0.836	0.838
1.00	0.841	0.843	0.846	0.848	0.850	0.853	0.855	0.857	0.859	0.862
1.10	0.864	0.866	0.868	0.870	0.872	0.874	0.877	0.879	0.881	0.883
1.20	0.884	0.886	0.888	0.890	0.892	0.894	0.896	0.898	0.899	0.901
1.30	0.903	0.904	0.906	0.908	0.909	0.911	0.913	0.914	0.916	0.917
1.40	0.919	0.920	0.922	0.923	0.925	0.926	0.927	0.929	0.930	0.931
1.50	0.933	0.934	0.935	0.937	0.938	0.939	0.940	0.941	0.942	0.944
1.60	0.945	0.946	0.947	0.948	0.949	0.950	0.951	0.952	0.953	0.954
1.70	0.955	0.956	0.957	0.958	0.959	0.959	0.960	0.961	0.962	0.963
1.80	0.964	0.964	0.965	0.966	0.967	0.967	0.968	0.969	0.969	0.970
1.90	0.971	0.971	0.972	0.973	0.973	0.974	0.975	0.975	0.976	0.976
2.00	0.977	0.977	0.978	0.978	0.979	0.979	0.980	0.980	0.981	0.981
2.10	0.982	0.982	0.983	0.983	0.983	0.984	0.984	0.985	0.985	0.985
2.20	0.986	0.986	0.986	0.987	0.987	0.987	0.988	0.988	0.988	0.989
2.30	0.989	0.989	0.989	0.990	0.990	0.990	0.990	0.991	0.991	0.991
2.40	0.991	0.992	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993
2.50	0.993	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.995	0.995
2.60	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996
2.70	0.996	0.996	0.996	0.996	0.996	0.997	0.997	0.997	0.997	0.997
2.80	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.998
2.90	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
3.00	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999

試題隨卷繳交