ISYS3401 IT Evaluation

Practice Quiz (2019)

Q1. Binomial Distribution (10 marks) [From Week 2]

Based on historical data, it is found that on average 35% of students have failed the quiz in INFO1000. If 8 students to be selected randomly in the INFO1000 class, what are the probabilities that

a) none (2 marks),
b) one (2 marks),
c) two (2 marks), and
d) two or more (4 marks)

students will fail the quiz?

Q2. t-test: Independent (Unpaired) Samples Test with Unequal Variance (15 marks) [From Week 3]

Two groups, namely Male and Female, of students enrolled in INFO1000 class. Below is a sample of 32 students (make-up of 16 Male and 16 Female) obtained for their mid-semester quiz (maximum mark is 20). Is there any difference in terms of performance of two gender groups? Below are the assumptions:

a. Population and Samples are Normal Distributed, and
b. Variances are assumed to be Unequal
c. Sample Male and Sample Female are independent

Male	Female
17.30	16.50
17.30	16.60
16.50	17.40
18.10	17.20
16.50	17.00
17.20	16.20
17.20	16.30
17.60	16.70
17.00	17.00
17.00	17.10
16.70	16.90
16.40	16.50
16.40	16.40
16.40	15.90
15.70	16.10
16.80	15.80

(a) Define Null Hypothesis H_0 (1 mark)

(b) Show the Mean and Standard Deviation for both groups (2 marks)

(c) Calculate T-Value (10 marks)

(d) Conclusion (2 marks) (df 30, critical value is 2.042, $p<0.05$)

Q3. McNemar's Test (10 marks) [From Week 4]

A study was conducted to assess whether a new website design of the University of Sydney affected student's choices in studying in the University of Sydney. Students were asked their preferences before and after the introduction of the new website. A total of 160 year 12 students completed the online questionnaire on both occasions.

Of the 90 students who were "undecided/leaning away" from choosing the University of Sydney before see the new website design, 45 were "leaning towards" choosing the University of Sydney after seeing the new website. Of the 70 who were "leaning towards" the University of Sydney before seeing the new website, 60 were still "leaning towards" the University after see the new website [Given $\chi^2 = 3.84$ (1 df) for P=0.05, $\chi 2 = 10.83$ (1 df) for P=0.001].

(a) Represent the data in a table (2 marks)

(b) Define your hypothesis, and use McNemar's Test to analyse the data. (5 marks)

(c) What is your finding from (b)? (3 marks)

Q4 Regression (15 marks) [From Week 5]

A call centre manager believes that customers would be much less upset about having to wait in a queue if they could be provided with a good estimate of the likely delay at the time they entered the queue. The manager suspects that the length of the queue at the time the customer joins the queue might be used to predict the delay. A random sample of 30 incoming calls is taken. The length of the queue at the time the customer joins the queue, and the delay (in seconds) before the customer speaks to a consultant are recorded. The manager then performs ordinary least squares regression on this data. The results are shown below:

Regression Statistics	
Multiple R	0.786
R Square	(vi)
Adjusted R Square	0.604
Standard Error	114.712
Observations	30

ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	(iia)	595264.3	(iii)	(v)	2.66E-07
Residual	(iib)	368448.1	(iv)		
Total	29	963712.5			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-159.083	53.798	-2.957	0.006	-269.283	-48.883
Queue Length, Q	49.255	368448.1	(i)	0.000	34.254	64.256

a. Determine the missing results labelled with (i), (iia), (iib), (iii), (iv), (v) and (vi). Show your calculations. (9 marks)

b. Determine the regression equation that explains the amount of waiting time by the number of customers in the queue. (2 marks)

c. Interpret the coefficients in (b). (2 marks)

d. Interpret the coefficient of determination. (2 marks)

Formula

Formulae to remember for Quiz and Examination are:

a) **All the formulae used in this practise quiz**
b) **Paired T-Test**
c) **Chi-Square Test**