| 考試科目 | 資訊管理 | 所別 | 資訊管理學系 | 考試時間 | 6月23日 星期二 上下午第 1 節 |
|---|---|---|---|---|---|

1. 網際網路的興起造就了虛擬社群(Virtual Communities)，試從掌握網路商机的观点，討論虛擬社群的经營模式。(25%)

2. 請討論質性研究(Qualitative Research)在資管學域應用的可能性及其優缺点。(25%)

3. 目前政府正在推動政府機關資訊業務的整體服務委外(outsourcing)，要做到整體服務委外，政府在資訊策略、資訊政策應有何因應措施，另其資訊部門之地位與角色、資訊人員之任務與專業知識等方面各應具備什麼條件？應如何進行？請分別說明之。(25%)

4 如何開發策略資訊系統(strategic information systems)？請說明策略資訊系統開發之步驟？它與傳統的 MIS 資訊系統開發有何相同與相異之處？(25%)

| 目 | 資訊科技 | 所別 | 資訊管理 | 考試時間 | 6月23日 星期二 (上)下午第二節 |
|---|---|---|---|---|---|

# 一、 Entrance Examination for MIS Doctorate Program Information Technology: Communication Networks

Time: 10:20 A.M. - 12:00 A.M., Date: 6-23-1998

There are 5 problems in this examination and each problem weights 10 points.

1. List two ways in which the OSI reference model and the TCP/IP reference model are the same. Also list two ways in which they are differ.

2. Ehternet frames must be at least 64 bytes long to ensure that the transmitter is still going in the event of a collision at the far end of the cable. Fast Ethernet has the same 64 byte minimum frame size, but can get the bits out ten times faster. How is it possible to maintain the same minimum frame size?

3. A simple telephone system consists of two end offices and a single toll office to which each end office is connected by a 1-MHz full-duplex trunk. The average telephone is used to make four calls per 8-hour workday. The mean call duration is 6 min. Ten percent of the calls are long-distance (i.e. pass through toll office). What is the maximum number of telephones an end-office can support?(Assume 4kHz per circuit.)

4. Point-of-sale terminals that use magnetic-stripe cards and PIN codes have a fatal flaw: a malicious merchant can modify his card reader to capture and store all the information on the card as well as the PIN code in order to capture and store all the information on the card as well as the PIN code in order to post additional(fake) transactions in the future. The next generation of point-of-sale terminals will use cards with a complete CPU, keyboard, and tiny display on the card. Devise a protocol for this system that malicious merchants cannot break.

| 目 | 資訊科技 | 所別 | 資訊管理 | 考試時間 | 6月23日(上)午第2節 星期二 |
|---|---|---|---|---|---|

5. A datagram subnet allows routers to drop packets whenever they need to. The probability of a router discarding a packet is $p$. Consider the case of a source host connected to the source router, which is connected to the destination router, and then to the destination host. If either of the routers discards a packet, the source host eventually times out and tries again. If both host-router and router-router lines are counted as hops, what is the mean number of
   a)hops a packet makes per transmission?
   b)transmissions a packet makes?
   c)hops required per received packet?

資訊科技（軟體工程）試題，可用中文或英文作答

1. What are the tasks of software configuration management? (12%)
2. What kinds of feasibility analyses should be included in a system analysis process? And how we can say a project is feasible? (15%)
3. Describe the guidelines for decomposition of a Data Flow Diagram. (10%)
4. What is the relationship between class and instance in the object-oriented design method? And what is the relationship between object and operation in the object-oriented design method? (13%)

| 科目 | 數量方法 | 所別 | 資訊管理 | 考試時間 | 6月23日 星期二 上午第2節 |
|---|---|---|---|---|---|

Statistics:

1. For a multiple regression model with Excel output.

Summary Output:

ANOVA Table

| Source | DF | SS | MS | F | P-value |
|---|---|---|---|---|---|
| Regression | 3 | 321946.8018 | 107316.6 | 8.9618 | 0.00272 |
| Residual | 11 | 131723.1982 | 11974.84 | | |

| | Coefficients | Standard Error | t-value | P-value |
|---|---|---|---|---|
| Intercept | 675.053 | 167.45954 | 3.923 | 0.0024 |
| X1 variable | 5.710 | 1.79 | 3.187 | 0.0087 |
| X2 variable | -0.42 | 0.32 | -1.294 | 0.2221 |
| X3 variable | -3.47 | 1.443 | -2.406 | 0.0349 |

(1) What is the regression equation? (4%)

(2) What is the test result for $H_0$: all partial regression coefficients are zeroes? $\alpha=0.05$ (2%)

(3) How to calculate R square from ANOVA table?(3%)

(4) What is the estimate of population variance?(3%)

(5) What is the test result for $H_0$: the partial regression coefficient for X3 is zero? $\alpha=0.05$ (4%)

(6) To estimate the 95%CI for X1's partial regression coefficient. (4%)

2. Suppose that we have the following data.

| y(dependent variable) | X1(independent variable) | X2(independent variable) |
|---|---|---|
| y1 | x11 | x21 |
| y2 | x12 | x22 |
| y3 | x13 | x23 |
| . | . | . |
| . | . | . |
| . | . | . |
| yn | x1n | x2n |

A multiple regression model is $y_i=\beta_0+\beta_1X1i+\beta_2X2i+\varepsilon i$, $i=1,2,\ldots,n$.

(1) Use matrix to express this regression model.(5%)

(2) Use matrix to show the lease square estimators of regression coefficients. (15%)

(3) Use matrix to show that the estimators of the regression coefficients are unbiased. (5%)

(4) Derive the variance of the estimators of the regression coefficients. (by matrix) (5%)

| 考試科目 | 數量方法 | 所別 | 資管所 | 考試時間 | 6 月 23 日 星期 二 上午第 2 節 |
|---|---|---|---|---|---|

**3.** (20%)

Consider the following LP and its optimal tableau:

$$\text{Minimize} \quad Z = c_1 x_1 + c_2 x_2$$

$$\text{subject to} \quad a_{11} x_1 + a_{12} x_2 \le b_1$$
$$a_{21} x_1 + a_{22} x_2 \le b_2$$
$$x_1 \ge 0,\ x_2 \ge 0.$$

| | $Z$ | $x_1$ | $x_2$ | $x_3$ | $x_4$ | |
|---|---|---|---|---|---|---|
| $Z$ | -1 | 0 | 0 | 2 | 3 | 5/2 |
| $x_1$ | 0 | 1 | 0 | 3 | 2 | 5/2 |
| $x_2$ | 0 | 0 | 1 | 1 | 1 | 1 |

Determine $c_1$, $c_2$, $b_1$, $b_2$, $a_{11}$, $a_{12}$, $a_{21}$, and $a_{22}$.

**4** (30%)

Find the optimal solution for the following problem as a function of 0, for $0 \le 0 \le 30$.

$$\text{Maximize} \quad Z(0) = 5x_1 + 6x_2 + 5x_3 + 12x_4$$

$$\text{subject to} \quad 3x_1 - 2x_2 + x_3 + 3x_4 = 5 - 20$$
$$x_1 + 2x_2 + x_3 + 2x_4 \le 3 + 0$$
$$x_1 \ge 0,\ x_2 \ge 0,\ x_3 \ge 0,\ x_4 \ge 0.$$

Then identify the value of 0 that gives the largest optimal value of $Z(0)$.

用錄：

t distribution critical values

| df | P .25 | .20 | .15 | .10 | .05 | .025 | .02 | .01 | .005 | .0025 | .001 | .0005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.000 | 1.376 | 1.963 | 3.078 | 6.314 | 12.71 | 15.89 | 31.82 | 63.66 | 127.3 | 318.3 | 636.6 |
| 2 | .816 | 1.061 | 1.386 | 1.886 | 2.920 | 4.303 | 4.849 | 6.965 | 9.925 | 14.09 | 22.33 | 31.60 |
| 3 | .765 | .978 | 1.250 | 1.638 | 2.353 | 3.182 | 3.482 | 4.541 | 5.841 | 7.453 | 10.21 | 12.92 |
| 4 | .741 | .941 | 1.190 | 1.533 | 2.132 | 2.776 | 2.999 | 3.747 | 4.604 | 5.598 | 7.173 | 8.610 |
| 5 | .727 | .920 | 1.156 | 1.476 | 2.015 | 2.571 | 2.757 | 3.365 | 4.032 | 4.773 | 5.893 | 6.869 |
| 6 | .718 | .906 | 1.134 | 1.440 | 1.943 | 2.447 | 2.612 | 3.143 | 3.707 | 4.317 | 5.208 | 5.959 |
| 7 | .711 | .896 | 1.119 | 1.415 | 1.895 | 2.365 | 2.517 | 2.998 | 3.499 | 4.029 | 4.785 | 5.408 |
| 8 | .706 | .889 | 1.108 | 1.397 | 1.860 | 2.306 | 2.449 | 2.896 | 3.355 | 3.833 | 4.501 | 5.041 |
| 9 | .703 | .883 | 1.100 | 1.383 | 1.833 | 2.262 | 2.398 | 2.821 | 3.250 | 3.690 | 4.297 | 4.781 |
| 10 | .700 | .879 | 1.093 | 1.372 | 1.812 | 2.228 | 2.359 | 2.764 | 3.169 | 3.581 | 4.144 | 4.587 |
| 11 | .697 | .876 | 1.088 | 1.363 | 1.796 | 2.201 | 2.328 | 2.718 | 3.106 | 3.497 | 4.025 | 4.437 |
| 12 | .695 | .873 | 1.083 | 1.356 | 1.782 | 2.179 | 2.303 | 2.681 | 3.055 | 3.428 | 3.930 | 4.318 |
| 13 | .694 | .870 | 1.079 | 1.350 | 1.771 | 2.160 | 2.282 | 2.650 | 3.012 | 3.372 | 3.852 | 4.221 |
| 14 | .692 | .868 | 1.076 | 1.345 | 1.761 | 2.145 | 2.264 | 2.624 | 2.977 | 3.326 | 3.787 | 4.140 |
| 15 | .691 | .866 | 1.074 | 1.341 | 1.753 | 2.131 | 2.249 | 2.602 | 2.947 | 3.286 | 3.733 | 4.073 |
| 16 | .690 | .865 | 1.071 | 1.337 | 1.746 | 2.120 | 2.235 | 2.583 | 2.921 | 3.252 | 3.686 | 4.015 |
| 17 | .689 | .863 | 1.069 | 1.333 | 1.740 | 2.110 | 2.224 | 2.567 | 2.898 | 3.222 | 3.646 | 3.965 |
| 18 | .688 | .862 | 1.067 | 1.330 | 1.734 | 2.101 | 2.214 | 2.552 | 2.878 | 3.197 | 3.611 | 3.922 |
| 19 | .688 | .861 | 1.066 | 1.328 | 1.729 | 2.093 | 2.205 | 2.539 | 2.861 | 3.174 | 3.579 | 3.883 |
| 20 | .687 | .860 | 1.064 | 1.325 | 1.725 | 2.086 | 2.197 | 2.528 | 2.845 | 3.153 | 3.552 | 3.850 |
| 21 | .686 | .859 | 1.063 | 1.323 | 1.721 | 2.080 | 2.189 | 2.518 | 2.831 | 3.135 | 3.527 | 3.819 |
| 22 | .686 | .858 | 1.061 | 1.321 | 1.717 | 2.074 | 2.183 | 2.508 | 2.819 | 3.119 | 3.505 | 3.792 |
| 23 | .685 | .858 | 1.060 | 1.319 | 1.714 | 2.069 | 2.177 | 2.500 | 2.807 | 3.104 | 3.485 | 3.768 |
| 24 | .685 | .857 | 1.059 | 1.318 | 1.711 | 2.064 | 2.172 | 2.492 | 2.797 | 3.091 | 3.467 | 3.745 |
| 25 | .684 | .856 | 1.058 | 1.316 | 1.708 | 2.060 | 2.167 | 2.485 | 2.787 | 3.078 | 3.450 | 3.725 |
| 26 | .684 | .856 | 1.058 | 1.315 | 1.706 | 2.056 | 2.162 | 2.479 | 2.779 | 3.067 | 3.435 | 3.707 |
| 27 | .684 | .855 | 1.057 | 1.314 | 1.703 | 2.052 | 2.158 | 2.473 | 2.771 | 3.057 | 3.421 | 3.690 |
| 28 | .683 | .855 | 1.056 | 1.313 | 1.701 | 2.048 | 2.154 | 2.467 | 2.763 | 3.047 | 3.408 | 3.674 |
| 29 | .683 | .854 | 1.055 | 1.311 | 1.699 | 2.045 | 2.150 | 2.462 | 2.756 | 3.038 | 3.396 | 3.659 |
| 30 | .683 | .854 | 1.055 | 1.310 | 1.697 | 2.042 | 2.147 | 2.457 | 2.750 | 3.030 | 3.385 | 3.646 |
| 40 | .681 | .851 | 1.050 | 1.303 | 1.684 | 2.021 | 2.123 | 2.423 | 2.704 | 2.971 | 3.307 | 3.551 |
| 50 | .679 | .849 | 1.047 | 1.299 | 1.676 | 2.009 | 2.109 | 2.403 | 2.678 | 2.937 | 3.261 | 3.496 |
| 60 | .679 | .848 | 1.045 | 1.296 | 1.671 | 2.000 | 2.099 | 2.390 | 2.660 | 2.915 | 3.232 | 3.460 |
| 80 | .678 | .846 | 1.043 | 1.292 | 1.664 | 1.990 | 2.088 | 2.374 | 2.639 | 2.887 | 3.195 | 3.416 |
| 100 | .677 | .845 | 1.042 | 1.290 | 1.660 | 1.984 | 2.081 | 2.364 | 2.626 | 2.871 | 3.174 | 3.390 |
| 1000 | .675 | .842 | 1.037 | 1.282 | 1.646 | 1.962 | 2.056 | 2.330 | 2.581 | 2.813 | 3.098 | 3.300 |
| ∞ | .674 | .841 | 1.036 | 1.282 | 1.645 | 1.960 | 2.054 | 2.326 | 2.576 | 2.807 | 3.091 | 3.291 |

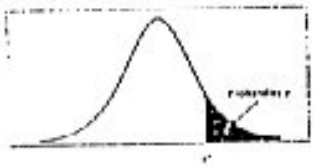


Table entry is the value $t^*$ with given probability $P$ lying above it.