

國立高雄大學九十八學年度碩士班招生考試試題

科目：統計學  
考試時間：100 分鐘

系所：  
資訊管理學系甲組  
本科原始成績：100 分

是否使用計算機：是

I. True/False Questions (If the answer is correct, please mark **O**, otherwise, mark **X**.) (32%)

1. The terms *median*, *fiftieth percentile*, and *second quartile* all represent the same value.
2. If the value of the coefficient of linear correlation is near zero for two variables, then the variables are not related.
3. If  $A$  is an event of a sample space  $S$  and if  $P(\bar{A})=0$ , then  $A=S$ .
4. The histogram for a binomial distribution that has a success probability close to one will be skewed to the right, and the histogram for a binomial distribution that has a success probability close to zero will be skewed to the left.
5. If the random variable  $z$  is the standard normal score, then the mean of the distribution of  $z$  is 1.
6. For a binomial distribution with a fixed value of  $p$ , the binomial distribution begins to look like a normal distribution as  $n$  increases in size.
7. The term *standard error of the mean* has the same meaning as the *standard deviation of the sample mean*.
8. If our decision in a hypothesis test is to reject the null hypothesis, then we are certain that the null hypothesis is false.
9. The alternative hypothesis, sometimes referred to as the research hypothesis, is supported by using the sample evidence to contradict the null hypothesis.
10. In a particular hypothesis test, if  $\alpha=0.05$  and  $p\text{-value}=0.042$ , then the correct decision would be to fail to reject the null hypothesis.
11. As sample size,  $n$ , becomes larger and larger, the value of  $t_{n-1, \alpha/2}$  becomes closer and closer in value to  $Z_{\alpha/2}$ .
12. Consider a right-tail hypothesis test concerning the mean difference between two dependent samples where  $d= x_1 - x_2$ . If we were to interchange the two populations, then the test would change to a left-tail hypothesis test.
13. If independent samples are drawn from two large populations, then the sampling distribution of  $\bar{x}_1 - \bar{x}_2$  will be normally distributed.
14. The chi-square distribution is skewed to the right.
15. In order to apply the  $F$  test, the sample standard deviation from each factor level sample must be the same.
16. Some nonparametric methods use a  $z$  test statistics. When this occurs the sample data is from a normal population.

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II. Multiple Choice Questions (Please only choose **one** best answer for each question.) (18%)

1. In the 1936 presidential election in USA, Alfred Landon was predicted (incorrectly) to beat Franklin D. Roosevelt based on the results of a telephone survey. Since not all people had telephones, the survey was biased because it related only to the opinion of those who could be reached by telephone. This historical incident represents which of the following?

- (A) An improperly defined parameter
- (B) An improperly defined sampling frame
- (C) A poorly defined population
- (D) A sample with no statistic defined for the sample
- (E) All of the above

2. Suppose  $A$  and  $B$  are two nonempty events of a sample space, then  $P(B)$  always equals which of the following?

- (A)  $P(B|A)$
- (B)  $P(B \text{ and } A) + P(B \text{ and } \bar{A})$
- (C)  $P(\bar{B}) - 1$
- (D)  $P(B \text{ or } A) \times P(B \text{ or } \bar{A})$
- (E) None of these.

3. Consider the following table:

$x$	$P(x)$
1	0.60
2	0.20
3	0.15
4	0.15

Which of the following is **not true**?

- (A) This is a probability distribution.
- (B) The histogram of this distribution is skewed to the right.
- (C)  $P(x < 3) = 0.80$
- (D) This is a binomial probability distribution.
- (E) The random variable is discrete.

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4. A sample size of 16 is selected from a normal population. For this population,  $P(x < 32.1) = P(z < 0.33)$ . Then,  $P(\bar{x} < 32.1) =$
- (A)  $P(z < 0.02)$ .  
 (B)  $P(z < 0.80)$ .  
 (C)  $P(z < 1.32)$ .  
 (D)  $P(z < 5.28)$ .  
 (E) None of these.
5. When the calculated value of  $F$ ,  $F^*$ , is greater than the table value for  $F$ , we will
- (A) fail to reject  $H_0$  and conclude that the factor being tested does have an effect on the variable.  
 (B) fail to reject  $H_0$  and conclude that the factor being tested does not have an effect on the variable.  
 (C) reject  $H_0$  and conclude that the factor being tested does have an effect on the variable.  
 (D) reject  $H_0$  and conclude that the factor being tested does not have an effect on the variable.  
 (E) None of the above are correct.
6. Given the following set of data, there are three degrees of freedom values. Identify the correct statement below.

		Replicates			
Factor levels	1	6	11	8	3
	2	9	10	11	10
	3	14	11	12	15

- (A)  $df(\text{Factor})=3$   
 (B)  $df(\text{Error})=8$   
 (C)  $df(\text{Total})=12$   
 (D) All of the above are correct  
 (E) None of the above are correct
7. Which of the following is **not** a property of the student's  $t$  distribution?
- (A) Mean equals zero.  
 (B) Standard deviation is greater than one.  
 (C) Symmetrical about zero.  
 (D) Used in testing hypotheses about  $\sigma$ .

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(E) In comparing student's  $t$  distribution to the standard normal distribution, we see that student's  $t$  distribution is less peaked and thicker at the tails.

8. You are testing the hypothesis  $p=0.7$  and have decided to reject this hypothesis if after 15 trials you observe 14 or more successes. If the null hypothesis is true and you observe 13 successes, then which of the following will you do?

- (A) Correctly fail to reject  $H_0$ .
- (B) Correctly reject  $H_0$ .
- (C) Commit a type I error.
- (D) Commit a type II error.
- (E) None of the above are correct.

9. Which of the following is the probability of having the computed value of the test statistic fall in the critical region when the null hypothesis is true?

- (A)  $\alpha$
- (B)  $1-\alpha$
- (C)  $\beta$
- (D)  $1-\beta$
- (E)  $1-(\alpha+\beta)$

III. Calculation Questions (50%)

1. A production process produces an item. On the average, 20% of all items produced are defective. Each item is inspected before being shipped. The inspector misclassifies an item 10% of the time. Suppose only items that pass inspection are shipped. Items not classified good are scrapped. What percentage of the items shipped are good? (8%)
2. The probability of producing a high-quality color print is 0.10. How many prints do we have to produce such that the probability of producing at least one quality print is larger than 0.90? (7%)
3. Two scholars report a whole series of  $t$ -test results from comparing various factors of perceptions between AACSB (American Assembly of Collegiate Schools of Business) accredited schools and non-AACSB accredited schools. The following table shows how respondents from AACSB-accredited and non-AACSB-accredited schools rated the

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importance of the ten faculty evaluation factors.

Factor	AACSB-Accredited Schools (n=176)	Non-AACSB-Accredited Schools (n=74)	Two-Tailed <i>t</i> -Test Probability
Articles in professional journals	4.49	2.87	0.000
Classroom teaching	3.34	4.31	0.000
Books as author or editor	3.23	2.45	0.000
Papers at professional meetings	3.09	2.65	0.001
Activity in professional societies	2.55	2.65	0.394
Campus committee work	2.25	3.16	0.000
Student advising	1.80	3.36	0.000
Public service	1.98	2.47	0.000
Advisor to student organizations	1.71	2.30	0.000
Consultation (business, government)	1.73	2.30	0.001

Note: A five-point scale with 1 = “not at all important” to 5 = “extremely important” was used in this analysis.

(Source: Tong and Bures, 1987)

Please answer the following questions:

- (1) Explain why the samples discussed in this article are independent samples. (3%)
- (2) Many of the reported *p*-values are 0.000. Explain what is implied by these *p*-values. (3%)
- (3) The *p*-value for “activity in professional societies” is 0.394. Explain what is implied by this *p*-value. (3%)

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4. In order to understand the effects of the four human resource related factors such as “project team competence” ( $F_1$ ), “communication” ( $F_2$ ), “rewards”(F<sub>3</sub>) and “change” ( $F_4$ ) on ERP systems implementation success (S), the researchers analyze the collected data by using the multiple regression analysis and the research results are shown below.

Dependent Variable: S

Source	Degree of freedom	Sum of square	<i>p</i> -value
Model		79.237	0.000
Error		317.903	
Corrected Total	227	397.140	

Parameter	Estimate	<i>t</i> value	<i>p</i> -value	Standard error of estimate
Intercept	2.408	4.505	0.000	0.535
$F_1$	0.485	5.500	0.000	0.088
$F_2$	0.134	2.255	0.025	0.059
$F_3$	-0.006	-0.094	0.926	0.061
$F_4$	-0.019	-0.260	0.795	0.074

Please answer the following questions:

- (1) What is the sample size? (2%)
- (2) Find the degree of freedom of model. (2%)
- (3) Find the degree of freedom of error. (2%)
- (4) Find the *F*-value. (4%)
- (5) Please write down the regression model. (2%)
- (6) Explain this regression model. (3%)
- (7) Do the four dimensions have significant effects on customer satisfaction at  $\alpha=0.01$  level in this model? Explain. (3%)
- (8) Which dimension(s) you will delete from this model ( $\alpha= 0.01$ )? Explain. (3%)
- (9) Find the value of r-square. (2%)
- (10) Explain the meaning of the r-square in this model. (3%)

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科目：資訊管理  
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**I. Multiple-Choice Questions (Please Choose the best one that answers the question; 20%)**

1. Which supply chain function tracks the shipment and accounting for returned goods or remanufactured products? (A) reverse distribution; (B) replenishment planning; (C) demand planning; (D) order planning; (E) payment commitment.
2. Transferring transaction data from a legacy system to the new system would be defined by which category of system design specifications? (A) conversion; (B) database; (C) manual procedures; (D) input; (E) output.
3. Who are the “stakeholders” in the design of a new information system? (A) end users who use the reports from the new system; (B) managers who control the information input to the new system; (C) people who have a direct interest in the information affected by the new system; (D) people who will pay for the new system; (E) people who design and develop the new system.
4. The fact that online advertising revenues are growing at 30% a year, while offline traditional advertising is growing at about 5% a year, suggests that (A) the Internet is transforming the traditional advertising business model; (B) offline traditional advertising is not very effective; (C) Internet advertising is very expensive; (D) new technologies are more efficient at selling to customers; (E) Internet advertising is much cheaper than offline traditional advertising.
5. Which of the following descriptions for ethical principles is not true? (A) Immanuel Kant’s Categorical Imperative: If an action is not right for everyone to take, it is not right for anyone; (B) The Golden Rule: Do unto others as you would have them do unto you; (C) The Utilitarian Principle: Take the action that achieves the higher or greater value; (D) Ethical No Free Lunch Rule: If an action cannot be taken repeatedly, it is not right to take at all; (E) Risk Aversion Principle: Take the action that produces the least harm or the least potential cost.
6. Compared to digital markets, traditional markets have: (A) lower search costs; (B) lower information asymmetry; (C) higher delayed gratification effects; (D) lower transaction costs; (E) weaker network effects.
7. A build-to-order supply-chain model is also called a: (A) supply-driven model; (B) demand-driven model; (C) replenishment-driven model; (D) push-based model; (E) stock-based model.
8. Which of the following are not used to capture tacit knowledge? (A) expert systems; (B) case-based reasoning; (C) neural networks; (D) fuzzy logic; (E) none of the above.

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9. Which of the following is not one of the typical enterprise applications? (A) enterprise resources planning system; (B) supply chain management system; (C) knowledge management system; (D) decision support system; (E) customer relationship management system.
10. The potentially most expensive “hidden” cost component of offshore software outsourcing is the cost of: (A) selecting a vendor; (B) adjusting to cultural differences; (C) laying off domestic employees; (D) transferring work to the offshore outsourcer; (E) managing contract.

**II. Short-Answer Questions (Please translate and explain the following terminologies in detail; 30%)**

1. EERP
2. ERM
3. Opt-in model and Opt-out model (for privacy)
4. Fourth Party Logistics
5. GIS
6. VMI

**III. Essay Question (50%)**

1. Recently, several companies prefer to employ “Virtual Integration” instead of “Physical Integration” as their supply chain strategies. Please explain this phenomenon from the perspectives of “Transaction Cost Theory” and “Agency Theory.” (10%)
2. Please list any three steps of knowledge management processes and explain them. (10%)
3. One day, little Henry, who is your nephew and a senior high school student, sent the following e-mail to you. How will you reply to this e-mail? (10%)

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*Dear Uncle,*

*I wish to choose Information Management (IM) as my major after I enter university. My computer teacher told me that IM is a hybrid of “Computer Science and Information Engineering (CSIE)” and “Business Administration (BA),” and the purpose of IM is to effectively manage business processes and activities by IT. But my friends argued that the technical and management courses in the IM department cannot be compared with the same courses in the departments of CSIE and BA. They also advised me against joining IM, stating that it is not a good choice if I am interested in technical issues. Now, I am very confused with these arguments. I heard from my mother that you graduated from the department of IM. Could you please explain what IM is and what it does for me? Thanks very much!*

*Sincerely yours,*

*Henry*

4. Peter, the CIO of KUN hotel, wishes to create a membership management system that will be used to store, analyze, and manage customer data. KUN hotel also can use this new system to send various messages of marketing campaigns to customers and deal with customer complaints. The most important consideration for Peter is to be able to offer the system as a new customer relationship management tool as soon as possible in order to raise customer satisfaction and increase corporate revenue. However, Susan, the Chief Customer Service Officer, doubts whether this new system would successfully meet Peter’s objectives. According to Susan’s prior experiences in interacting with customers, she believes that most customers will not be willing to leave their check-in data in this new system so that membership recruitment would be difficult in terms of execution. Peter thinks Susan’s concerns are not so critical for this new system and believes that this new system is technically feasible and will improve the company’s competitive advantage. Please explain why Peter and Susan have different opinions about the membership management system. Assume that you are the CEO of KUN hotel. Will you introduce the system proposed by Peter? Please also elaborate the consideration for your answers. (20%)

國立高雄大學九十八學年度碩士班招生考試試題

科目：計算機概論  
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資訊管理學系乙組  
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I. Single Choice Questions (30%)

- 1.( ) A **Pebibyte** (PiB; Petabyte) is [A]  $2^{10}$  [B]  $2^{20}$  [C]  $2^{30}$  [D]  $2^{40}$  [E]  $2^{50}$  bytes.
- 2.( ) A \_\_\_\_\_ is a group of compromised computers connected to a network such as the Internet that are being used as part of a network that attacks other networks. [A] hacker [B] script kiddie [C] Trojan horses [D] fireware [E] botnet.
- 3.( ) For there are three processes as in the table below, please use the SRTF (Shortest-Remaining Time-First) CPU scheduling to calculate the average waiting time of the three processes. The average waiting time is: [A] 3 [B] 4 [C] 5 [D] 6 [E] 7

Process	Arrival Time	Burst Time
P1	0	9
P2	2	4
P3	3	5

- 4.( ) A disk scheduling mechanism in an operation system causes the disk arm to sweep back and forth across the disk surface servicing all requests in its path, which is similar to the operation mechanism of elevator. This scheduling is called: [A] First Come First Served (FCFS) [B] Shortest Seek Time First (SSTF) [C] Scan [D] Look [E] None of the above.
- 5.( ) The distance between pixels on a screen is called screen's [A] resolution. [B] viewable size. [C] scan rate. [D] clarity. [E] dot pitch.
- 6.( ) The term \_\_\_\_\_ identifies any network based on 802.11 series of standards. [A] WiMax [B] RFID [C] Wi-Fi [D] Bluetooth [E] IrDA.
- 7.( ) A \_\_\_\_\_ is a huge database that stores and manages the data required to analyze historical and current transactions. [A] data warehouse [B] multidimensional database [C] data mining [D] web database [E] object-oriented database.
- 8.( ) E-commerce and other web applications often rely on \_\_\_\_\_ to identify users and customize web pages. [A] MAC address [B] web cache [C] WEP Key [D] Session [E] Cookies.

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- 9.( ) Which of the following protocols is used for sending email? [A] MIME [B] IMAP [C] POP3 [D] SMTP [E] SNMP.
- 10.( ) Which of the followings will output FALSE ? [A] (32<50)&&(999<1000) [B](12<4)|| (13<5) [C] !("abc"= "ABC") [D] 123= ="123"

## II. Please Explain and Compare the differences of following pairs of computer terminologies (36%)

1. Spam vs. Scam
2. Virtual machine vs. Virtual memory
3. Computer virus vs. Worms
4. Primary key vs. Candidate Key
5. Vector graph vs. Bitmap graph
6. Abstract vs. Interface (in Java language)

## III. Programming (34%)

1. Please write a pseudo code to design an algorithm for a **web crawler**. (15%). Please also calculate time complexity of the algorithm (5%).  
[The definition of web crawler in **Wikipedia**: A Web crawler is one type of bot, or software agent, also known as a Web spider, Web robot. In general, it starts with a list of URLs to visit, called the seeds. As the crawler visits these URLs, it identifies all the hyperlinks in the page and adds them to the list of URLs to visit, called the crawl frontier. URLs from the frontier are recursively visited according to a set of policies.]
2. Please write a program for a **Lottery number auto-selector**. The rule of the Lottery is to pick up 5 numbers between 1 to 42, and the 5 numbers are not allowed to be repeated. (You can use C or C++ or Java as the programming language) (14%)

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**Part I. Answer the following questions. (10% each)**

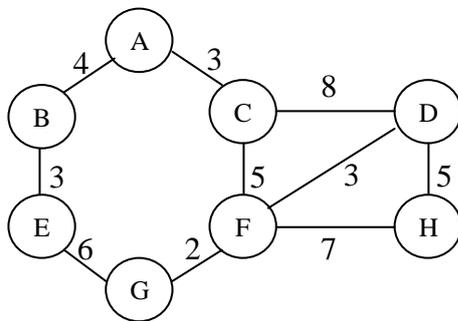
1. A binary tree has 10 nodes. The preorder and inorder traversals of the tree are shown below.  
Draw the tree.

Preorder: JCBADEFIGH

Inorder: ABCEDFJGIH

2. Create a binary search tree using the following data entered as a sequential set: 7 10 14 13 17 20 40 56 55 23.

3. Giving the graph below:



- (a) Find the minimum spanning tree of the graph.  
(b) Give the adjacency matrix representation of the graph.  
(c) Find the shortest path between node A and all other nodes in the graph.
4. Change the following postfix or prefix expressions to infix:  
(a)  $A B * C - D +$   
(b)  $+ - * A B C D$

**Part II. Write programs according to the descriptions of the problems. You should define necessary data structures in each problem. You can use C, C++, or Java to implement the programs unless the problems mentioned. (15% each)**

- Write a C function that uses recursion to read positive integers from keyboard and print these integers in reverse order. The input ends when a negative integer is met. For example, when integers 10 20 30 40 -1 are entered, the function will print 40 30 20 10.
- Write a function to check whether the contents of two stacks have the same number of elements. Neither stack should be changed.
- Write a function that merges two ordered lists into one list. When two lists are merged, the data in the resulting list are also ordered. The first list should be the resulting list after merging. Use linked list implementation.
- Write an algorithm that determines whether a binary tree is complete.