國立政治大學 100 學年度研究所 頂土 班招生考試試題

第 1 頁,共3頁

考試科目計算機概論 所別資訊管理學系商管組/科技組 考試時間 2月37日(日)第一節

Answer Yes (O) /No (X) for the following descriptions: (40%)

- 1. Only methods of the same package or of its subclasses can access private instance variables in Java
- 2. A "static" variable in Java is declared as a variable that is associated with the class, not with that individual instances (objects) of the class
- 3. "Inheritance" in an object-oriented design language provides a way to reuse code under a hierarchical structure
- 4. An object is "polymorphism" if it has only one form and behaves methods in one way
- 5. The concrete type of a generic type variable is defined at compile time
- 6. A size n arraylist using linked-list-based implementation takes O(1) time for getting A[i]
- 7. An array-based stack takes O(1) time for push(k) and pop() within its maximum size
- 8. The lower bound of sorting n elements in general is O(n log n) time
- 9. Removing the tail in a singly linked list takes O(1) time
- 10. A heap-order specifies the relations between silbling nodes, e.g., the value stored in the left child is greater than the value stored in the right child
- 11. Insertion-sort and selection-sort are quardratic sorting algorithms, i.e., it takes O(n²) time for sorting n elements
- 12. A heap with n keys can be implemented as an array of length n+1, where for the node at rank i, the left child is at rank 2i and the right child is at rank 2i+1
- 13. According to Big-Oh rules, $1000 \text{ n} \log n + n^2 4000 \text{ n}$ is $O(n \log n)$
- 14. The idea of the Brute-force approach is to find the optimum solution by exhaustively searching all possible solutions
- 15. The idea of the Greedy approach is to find the optimum solution by computing the local optimal at each step
- 16. A postorder traversal of a binary search tree visits the keys in a decreasing order
- 17. An AVL tree is a binary search tree where for every internal node, the heights of its children are the same
- 18. In a hash table, a collision occurs when an element is mapped to different cells of the table.
- 19. The number of edges in a directed graph is less than (n(n-1))/2 (n is the number of vertices in the graph)
- 20. A spanning tree of a graph is a tree that covers all connected vertices in a graph

國立政治大學 100 學年度研究所為士班招生考試試題

第 之頁,共3頁

考試科目計算機概論 所別資訊管理學系商管組/科技組 考試時間 →月→7日(日)第一節

Answer the following questions:

- 1. Sum the n elements of an integer array A.
 - 1,1 (10%) The first idea is using a loop and iteratively adding each element to sum. Complete the following psudo code and analyze its time complexity.

Algorithm IterativeSum(A, i, n):

Input: an array A and integers i and n

Output: The sum of the n integers in A starting at index i

1,2. (10%) The second idea is to divide n elements to two parts, recursively sum the first half of A and sum the second half of A, and add these two values together. Complete the pseudo code and write its time complexity in a recursive equation.

Algorithm BinarySum(A, i, n):

Input: an array A and integers i and n

Output: The sum of the n integers in A starting at index i

- 2. (15%) Use a bottom-up construction to build a min-heap of {32, 6, 21, 15, 18, 92, 20, 14, 7, 42, 51, 33, 25} (the value of the parent node is smaller than the value of its child node), and then apply removeMin() to the heap. (Describe the approach and show the result step by step.)
- 3. (10%) Consider a hash table storing integer keys that handles collision with separate chaining. Let N=17. h(k) = k mod 17. Insert keys 29, 41, 22, 12, 8, 25, 26, 33, 36, and show the final result of the hash table.

考試科目計算機概論 所別資訊管理學系 考試時間 2月7日(月)第一節 商管組/科技組

4. You are planning your course schedule. The course prerequisites are:

CS15: (none)

CS16: CS15

CS22: (none)

CS31: CS15, CS22 CS32: CS16, CS31

CS126: CS22, CS32, CS16

CS127: CS16

CS141: CS22, CS16

CS169:CS32

4.1 (8%) Draw a directed graph representing the prerequisites of all courses.

4.2 (7%) Find the sequence of the courses that allows you to satisfy all the prerequisites (using a

topological order in the graph).

考試科目

管理資訊系統

所 别

資訊管理

考試時間 2月27日(日)第3節

一、(35分)

- (1) 請以你所知的資訊應用為例,來說明 RFID (Radio Frequency Identification)的系統應包含哪些元件?(10分)
- 請評述這個資訊應用構想的價值:「為了環保,請廠商在銷售瓶罐飲 (2)料時,貼上 RFID,政府廣設特殊設計的垃圾桶,內含相關機制來對 垃圾分類 (25分)

二、(30分)

- (1) 請以你所知為例,來說明 QR (Quick Response) Code 的應用,是如 何操作? (5分)
- (2) 請評述這個資訊應用構想的價值:「為方便統一發票對獎,請廠商在 銷售商品時,順便產生 QR Code 印製於發票上,內含消費時間及發票 號碼,上傳某網站。消費者登記為該網站會員。日後消費者可以照相 手機,針對每件自己消費所產生的 QR Code 來對統一發票獎」(25分)

三、(35分)

- 請說明 Web 2.0 的基本核心原則與精神(10分) (1)
- 請評述下一網站是否符合 Web 2.0 : 「某揪團網站會定期公布欲團購 (2) 的商品,網站有留言板的設計,提供訪客回應是否願意参加團購」(25 分)

考試科目

絕計學所別資管多(科技組)考試時間2月2月1日第3節

共七題(每題各佔 10 到 15 分):

1. (15%) 下表為某年度大學指定考試,國文、英文、物理三科成績的統計表:

	最小值	12%	25%	50%	平均數	75%	88%	最大值	標準差
國文	0	27	34	44	43.56	53	60	93	13.88
英文	0	8	16	34	36.68	56	69	98	23.88
物理	0	6	12	23	28.75	41	57	100	21.50

- (a) 試以上述統計數值,描述這三科成績的分佈特性。(註:對稱、常態分配等)
- (b) 以表格提供的數據繪製 Boxplox,並說明圖形顯示的資訊和(a)小題的結果 一致;另外,判斷這三科是否有離群值(Outlier)。
- 2. (10%) 抽樣(Sampling)在統計扮演重要的角色
 - (a) 列出至少四種常見的機率抽樣(Probability Sampling)方法,並舉例說明這幾 種方法特性與不同之處
 - (b) 臺灣地區的民意調查多半使用哪一種機率抽樣,並說明如何操作。
- 3. (15%) 解釋下列名詞及結果,並說明必要的假設條件:
 - (a) 中央極限定理(Central Limit Theorem);
 - (b) 95%信賴區間(Confidence Interval)中 95%代表的意義
 - (c) 為什麼民意調查中多半有 1068 位受訪者?
- 4. (15%) 投擲某個硬幣 100 次,以驗證該硬幣是否為公正硬幣。
 - (a) 寫出虛無假設(Null Hypothesis)與對立假設(Alternative Hypothesis);
 - (b) 如果以 p-value、臨界值法(Critical Value)、信賴區間法,分別檢定(a)中的 虚無假設,請列出這三種方法拒絕或不拒絕的條件;
 - (c) 另外,某人被指控某種罪行(例如:毀謗、搶劫),通常虛無假設會如何 指定,說明你/妳的想法。

註 備

試 題 隨 卷 交 考試科目

5. (18%) 下表為某系十位學生的能力測驗分數(Y)與學期平均分數(GPA),想要 以 GPA 預估學生的能力 (註:迴歸分析):

Y	26.0	31.0	28.0	30.0	34.0	38	41.0	44.0	40.0	43.0
GPA	1.8	2.3	2.6	2.4	2.8	3	3.4	3.2	3.6	3.8

- (a) 以最小平方法(Least Squares)求出迴歸方程式的係數;
- (b) 計算判定係數(Coefficient of Determination),並以此說明迴歸方程式的強度;
- (c) 迴歸方程式中的斜率顯著嗎? (顯著水準 α = 0.05)
- (d) 以變異數分析(Analysis of Variance)的模式完成下表:

Source	SS	d.f.	MS	F
Regression		1		
Error		8		
Total		9		

6. (15%) 調查選修統計學與智力測驗的關聯。令 X 與 Y 分別為下表 15 位學生 在選修統計學之前與之後的智力測驗成績, D=X-Y為選課前後的智商差 異, m_D 為智商差異的中位數。想要檢定虛無假設 $H_0: m_D = 0$ vs.對立假設 $H_1: m_D \neq 0$,在顯著水準為 $\alpha = 0.10$ 之下,敘述你/妳的分析結果。(註:請詳 細說明使用的檢定方法,像是1-檢定或是無母數檢定。)

Before	After	Before	After	Before	After
93	75	116	117	121	127
98	85	106	98	123	132
109	103	111	108	127	141
104	94	114	113	121	127
95	79	129	145	123	132

7. (12%) 某科目的期末考成績服從常態分配,隨機抽出 40 位同學的期末成績列 於下表,樣本平均數及樣本標準差分別為 83.1 及 10.43:

56	63	65	68	72	72	73	75
78	79	80	80	80	80	80	80
82	84	84	86	86	87	88	90
92	93	93	94	95	96	97	98

- (a) 列出虛無假設、對立假設:
- (b) 計算適合度檢定(Goodness-of-fit Test)的統計量;
- (c) 若顯著水準為 99%,驗證上述期末考成績是否服從常態分配。

流行学 所则資管多(科技组)考試時間2月2月日第3節 考試科目

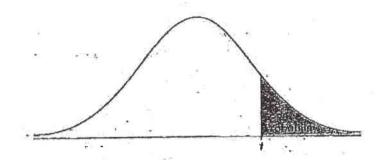


TABLE B: 1-DISTRIBUTION CRITICAL VALUES

1 1.0 2 8 8 77 4 77 5 77 6 77 77 8 77 77 8 77 77 10 11 12 13 14 15 15 16 17 16 17 18 19 16 17 18 19 16 17 18 19 16 17 18 19 16 17 18 18 19 16 17 18 18 19 16 17 18 18 19 18 19 18 19 18 19 18 18 19 18 18 19 18 18 18 18 18 18 18 18 18 18 18 18 18	25 000 816 765 741 771 771 771 771 771 771 771	20 1,376 1,061 978 941 920 906 896 889 883 879 876 868 866 865 863 862 861 860 859 858	.15 1.963 1.386 1.250 1.190 1.156 1.134 1.100 1.093 1.088 1.083 1.079 1.074 1.074 1.074 1.067 1.066 1.064 1.063 1.063	,10 3.078 1.886 1.638 1.533 1.476 1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.341 1.337 1.333 1.337 1.333 1.332 1.332	,05 6.314 2.920 2.353 2.132 2.015 1.943 1.895 1.860 1.823 1.812 1.796 1.771 1.761 1.771 1.761 1.773 1.746 1.740 1.734 1.739 1.729 1.725 1.721	,025 12.71 4.303 3.182 2.776 2.571 2.447 2.365 2.306 2.262 2.228 2.201 2.179 2.165 2.145 2.131 2.120 2.101 2.101 2.093 2.086 2.080	.02 15.89 4.849 3.482 2.999 2.757 2.612 2.517 2.449 2.398 2.398 2.328 2.303 2.282 2.249 2.249 2.224 2.214 2.205 2.197	.01 31.82 6.965 4.541 3.747 3.365 3.143 2.998 2.821 2.768 2.681 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539 2.528	.005 63.66 9.925 5.841 4.604 4.032 3.707 3.499 3.355 3.250 3.169 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861 2.845	.0025 127.3 14.09 7.453 5.598 4.773 4.317 4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.286 3.286 3.252 3.222 3.197 3.174 3.153	318.3 22.33 10.21 7.173 5.893 5.208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579 3.552	.0005 636.6 31.60 12.92 8.610 6.869 5.959 5.408 5.041 4.781 4.37 4.318 4.211 4.140 4.073 4.015 3.965 3.922 3.883 3.850
2 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	816 765 741 777 718 771 706 700 697 699 699 688 688 688 688 688 688 688	1,061 978 941 920 906 ,889 ,879 ,876 873 ,876 863 ,865 ,863 ,863 ,862 ,861 ,860 ,859 ,858	1.386 1.250 1.190 1.156 1.134 1.119 1.108 1.100 1.093 1.088 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.886 1.638 1.533 1.476 1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.337 1.337 1.333 1.330 1.328 1.328 1.325 1.323	2.920 2.353 2.132 2.015 1.943 1.895 1.860 1.823 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	4.303 3.182 2.776 2.571 2.447 2.365 2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.101 2.093 2.086	4,849 3,482 2,999 2,757 2,612 2,517 2,449 2,359 2,328 2,303 2,282 2,264 2,249 2,235 2,224 2,214 2,205 2,197	6.965 4.541 3,747 3,365 3,143 2,998 2,896 2,821 2,764 2,718 2,681 2,650 2,624 2,602 2,583 2,567 2,552 2,539	9,925 5,841 4,604 4,032 3,707 3,499 3,355 3,230 3,169 3,055 3,012 2,977 2,947 2,947 2,947 2,947 2,898 2,878 2,861	14.09 7.453 5.598 4.773 4.317 4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.286 3.252 3.252 3.252 3.197 3.174	22.33 10.21 7.173 5.893 5.208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	31.60 12.92 8.610 6.869 5.959 5.408 5.041 4.781 4.237 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
3 7 4 7 5 7 7 7 8 9 7 10 11 6 6 6 15 6 16 6 17 18 6 19 20 6 6 6 17 18 6 19 20 6 6 6 7 22 23 6 6 6 7 6 6 6 7 6 7 6 7 6 8	765 741 777 718 7718 7711 706 700 697 699 699 668 668 668 668 668 668 668 668	.978 .941 .920 .906 .896 .839 .876 .876 .868 .865 .863 .862 .861 .860 .859 .858	1.250 1.190 1.156 1.134 1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.638 1.533 1.476 1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.330 1.328 1.328	2.353 2.132 2.015 1.943 1.895 1.860 1.823 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	3.182 2.776 2.571 2.447 2.365 2.306 2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.101 2.093 2.086	3.482 2.999 2.757 2.612 2.517 2.449 2.398 2.359 2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	4.541 3,747 3,365 3,143 2,998 2,821 2,764 2,718 2,681 2,650 2,624 2,602 2,583 2,567 2,552 2,539	5.841 4.604 4.032 3.707 3.499 3.355 3.250 3.169 3.055 3.012 2.977 2.947 2.947 2.898 2.878 2.861	7,453 5,598 4,773 4,317 4,029 3,833 3,690 3,581 3,497 3,428 3,372 3,326 3,236 3,236 3,232 3,232 3,197 3,174	10.21 7.173 5.893 5.208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	12.92 8.610 6.869 5.959 5.408 5.041 4.781 4.237 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
3 7 4 7 5 7 7 7 8 9 7 10 11 6 6 6 15 6 16 6 17 18 6 19 20 6 6 6 17 18 6 19 20 6 6 6 7 22 23 6 6 6 7 6 6 6 7 6 7 6 7 6 8	765 741 777 718 7718 7711 706 700 697 699 699 668 668 668 668 668 668 668 668	.978 .941 .920 .906 .896 .839 .876 .876 .868 .865 .863 .862 .861 .860 .859 .858	1.190 1.156 1.134 1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.533 1.476 1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.330 1.328 1.328 1.325 1.323	2.132 2.015 1.943 1.895 1.860 1.833 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.776 2.571 2.447 2.365 2.306 2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.101 2.093 2.086	2,999 2,757 2,612 2,517 2,449 2,398 2,359 2,328 2,303 2,282 2,264 2,249 2,224 2,214 2,205 2,197	3,747 3,365 3,143 2,998 2,896 2,821 2,764 2,718 2,681 2,650 2,624 2,602 2,583 2,567 2,552 2,539	4.604 · 4.032 3.707 3.499 3.355 3.250 3.169 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	5.598 4.773 4.317 4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.236 3.232 3.252 3.252 3.252 3.197 3.174	7.173 5.893 5.208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	8.610 6.869 5.959 5.408 5.041 4.781 4.231 4.140 4.073 4.015 3.965 3.922 3.883
4 7.7 5 7.7 7 7.7 8 9 7.7 10 11 6.6 15 6.6 17 18 6.6 17 18 6.6 17 18 6.6 19 20 6.6 21 22 23 6.6 22 24 6.6 27 6.6 27 6.6	741 727 718 711 706 703 700 697 695 699 689 688 688 688 688 688	.941 .920 .906 .896 .889 .876 .876 .876 .863 .866 .863 .862 .861 .860 .859	1.190 1.156 1.134 1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.476 1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.328 1.328 1.325 1.323	2.015 1.943 1.895 1.860 1.823 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.571 2.447 2.365 2.306 2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.101 2.093 2.086	2.757 2.612 2.517 2.449 2.398 2.359 2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	3,365 3,143 2,998 2,896 2,821 2,764 2,718 2,681 2,650 2,624 2,602 2,583 2,567 2,552 2,539	4.032 3.707 3.499 3.355 3.250 3.169 3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	4.773 4.317 4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.236 3.232 3.222 3.197 3.174	5.893 5.208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	6.869 5.959 5.408 5.041 4.781 4.231 4.231 4.140 4.073 4.015 3.963 3.922 3.883
5 7 6 7 7 8 7 7 8 9 7 10 12 6 13 6 14 6 15 6 16 17 6 18 19 20 6 21 22 23 6 22 24 6 25 26 6 27 28 6	727 718 711 706 703 700 697 695 694 692 691 689 688 688 688 688 688 686 686 686	.920 .906 .896 .889 .879 .876 .876 .863 .865 .863 .862 .861 .860 .859 .858	1.156 1.134 1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.440 1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.328 1.328 1.325 1.323	1.943 1.895 1.860 1.823 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.447 2.365 2.306 2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.101 2.093 2.086	2.612 2.517 2.449 2.398 2.359 2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	3.143 2.998 2.896 2.821 2.764 2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3,707 3,499 3,355 3,250 3,169 3,106 3,055 3,012 2,977 2,947 2,921 2,898 2,878 2,861	4.317 . 4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.232 3.197 3.174	5 208 4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	5.959 5.408 5.041 4.781 4.587 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7	718 7711 706 703 700 697 695 695 699 689 688 688 688 688 688 688	.906 .896 .889 .879 .876 .876 .868 .865 .865 .863 .862 .861 .860 .859 .858	1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.328 1.328 1.325 1.323	1.895 1.860 1.833 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2,365 2,306 2,262 2,228 2,201 2,179 2,160 2,145 2,131 2,120 2,110 2,101 2,093 2,086	2.517 2.449 2.398 2.359 2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	2.998 2.896 2.821 2.764 2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.499 3.355 3.250 3.169 3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	4.029 3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.286 3.252 3.252 3.197 3.174	4.785 4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	5.408 5.041 4.781 4.587 4.318 4.221 4.140 4.073 4.015 3.963 3.922 3.883
7 77 8 9 77 10 77 11 66 15 66 17 18 66 17 18 66 17 18 66 17 18 66 19 20 66 21 22 66 22 23 66 27 66 27 66	711 706 703 700 697 695 694 692 691 689 688 688 687 686 686	.889 .833 .879 .876 .876 .868 .865 .865 .863 .862 .861 .860 .859 .858	1.119 1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.415 1.397 1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.328 1.328 1.325 1.323	1.860 1.833 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2,306 2,262 2,228 2,201 2,179 2,160 2,145 2,131 2,120 2,110 2,101 2,093 2,086	2,449 2,398 2,359 2,328 2,303 2,282 2,264 2,249 2,235 2,224 2,214 2,205 2,197	2.896 2.821 2.764 2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.355 3.250 3.169 3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.833 3.690 3.581 3.497 3.428 3.372 3.326 3.286 3.252 3.252 3.197 3.174	4.501 4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	5:041 4.781 4.587 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
8 77 10 77 11 66 12 66 15 66 17 18 66 17 18 66 19 20 66 21 22 23 66 22 24 66 27 28 66	703 700 697 695 694 692 691 689 688 688 688 686 686 686	.889 .833 .879 .876 .876 .868 .865 .865 .863 .862 .861 .860 .859 .858	1.108 1.100 1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.833 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.262 2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.110 2.101 2.093 2.086	2.398 2.359 2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	2.821 2.764 2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.250 3.169 3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.690 3.581 3.497 3.428 3.372 3.326 3.286 3.252 3.222 3.197 3.174	4.297 4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	4.781 4.437 4.318 4.221 4.140 4.015 3.965 3.922 3.883
9 7 10 7 11 6 12 6 13 6 14 6 15 6 16 15 16 6 17 18 6 19 20 6 21 22 23 6 22 24 6 25 6 27 6 28 6	703 700 697 695 694 692 691 689 688 688 688 686 686 686	.883 .879 .876 .873 .870 .868 .865 .863 .862 .861 .860 .859 .858	1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.383 1.372 1.363 1.356 1.350 1.345 1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.833 1.812 1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.228 2.201 2.179 2.160 2.145 2.131 2.120 2.110 2.101 2.093 2.086	2,359 2,328 2,303 2,282 2,264 2,249 2,235 2,224 2,214 2,205 2,197	2.764 2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.169 3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.581 3.497 3.428 3.372 3.326 3.286 3.252 3.222 3.197 3.174	4.144 4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	4.587 4.437 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
10 7 11 6 12 6 13 6 14 6 15 6 16 5 17 6 18 6 19 6 20 6 21 6 22 6 6 24 6 25 6 6 27 6 6	597 595 594 592 691 590 688 688 688 686 686 686	.879 .876 .873 .870 .868 .865 .865 .863 .862 .861 .860 .859	1.093 1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.363 1.356 1.356 1.345 1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.796 1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2,201 2,179 2,160 2,145 2,131 2,120 2,110 2,101 2,093 2,086	2.328 2.303 2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	2.718 2.681 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.106 3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.497 3.428 3.372 3.326 3.286 3.252 3.222 3.197 3.174	4.025 3.930 3.852 3.787 3.733 3.686 3.646 3.611 3.579	4.437 4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
11 6 12 6 13 6 14 6 15 6 16 5 17 6 18 6 19 6 20 6 21 6 22 6 24 6 25 6 26 6 27 6 28 6	597 595 594 592 691 590 688 688 688 686 686 686	873 870 868 866 865 863 862 861 860 859 858	1.088 1.083 1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.356 1.350 1.345 1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.782 1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.179 2.160 2.145 2.131 2.120 2.110 2.101 2.093 2.086	2,303 2,282 2,264 2,249 2,235 2,224 2,214 2,205 2,197	2.681 ; 2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.055 3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.428 3.372 3.326 3.286 3.252 3.222 3.197 3.174	3 930 3 852 3 787 3 733 3 686 3 646 3 611 3 579	4.318 4.221 4.140 4.073 4.015 3.965 3.922 3.883
12 6 6 6 15 6 16 16 6 17 6 18 6 19 6 22 6 6 22 24 6 25 26 6 27 6 28 6 6	595 594 592 590 590 688 688 688 688 686 686	370 \$68 .866 .865 .863 .862 .861 .860 .859 .858	1.079 1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1,350 1,345 1,341 1,337 1,333 1,330 1,328 1,325 1,323	1.771 1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.145 2.145 2.131 2.120 2.110 2.101 2.093 2.086	2.282 2.264 2.249 2.235 2.224 2.214 2.205 2.197	2.650 2.624 2.602 2.583 2.567 2.552 2.539	3.012 2.977 2.947 2.921 2.898 2.878 2.861	3.372 3.326 3.286 3.252 3.222 3.197 3.174	3.852 3.787 3.733 3.686 3.646 3.611 3.579	4.221 4.140 4.073 4.015 3.965 3.922 3.883
14 .6 .6 .5 .17 .6 .6 .17 .6 .6 .19 .6 .6 .21 .6 .6 .22 .6 .6 .27 .6 .22 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .28 .6 .6 .27 .6 .28 .6 .6 .27 .28 .6 .6 .27 .28 .6 .27 .28 .6 .27 .28 .28 .28 .28 .28 .28 .28 .28 .28 .28	692 691 690 689 688 688 687 686 686	\$68 .865 .863 .863 .862 .861 .860 .859 .858	1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.345 1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.145 2.131 2.120 2.110 2.101 2.093 2.086	2.264 2.249 2.235 2.224 2.214 2.205 2.197	2.624 2.602 2.583 2.567 2.552 2.539	2.977 2.947 2.921 2.898 2.878 2.861	3,326 3,286 3,252 3,222 3,197 3,174	3.787 3.733 3.686 3.646 3.611 3.579	4.140 4.073 4.015 3.965 3.922 3.883
14 .6 .6 .5 .17 .6 .6 .17 .6 .6 .19 .6 .6 .21 .6 .6 .22 .6 .6 .27 .6 .22 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .6 .27 .6 .28 .6 .6 .27 .6 .28 .6 .6 .27 .28 .6 .6 .27 .28 .6 .27 .28 .6 .27 .28 .28 .28 .28 .28 .28 .28 .28 .28 .28	691 689 688 688 688 686 686 686	\$68 .865 .863 .863 .862 .861 .860 .859 .858	1.076 1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.341 1.337 1.333 1.330 1.328 1.325 1.323	1.761 1.753 1.746 1.740 1.734 1.729 1.725	2.131 2.120 2.110 2.101 2.093 2.086	2.249 2.235 2.224 2.214 2.205 2.197	2.602 2.583 2.567 2.552 2.539	2.947 2.921 2.898 2.878 2.861	3,286 3,252 3,222 3,197 3,174	3,733 3,686 3,646 3,611 3,579	4.073 4.015 3.965 3.922 3.883
15 6 16 5 17 6 18 6 19 6 20 6 21 6 22 6 24 6 25 6 26 6 27 6 28 6	691 689 688 688 688 686 686 686	.866 .863 .863 .862 .861 .860 .859	1.074 1.071 1.069 1.067 1.066 1.064 1.063	1.337 1.333 1.330 1.328 1.325 1.323	1.746 1.740 1.734 1.729 1.725	2.120 2.110 2.101 2.093 2.086	2.235 2.224 2.214 2.205 2.197	2.583 2.567 2.552 2.539	2.921 2.898 2.878 2.861	3,252 3,222 3,197 3,174	3.686 3.646 3.611 3.579	4.015 3.965 3.922 3.883
16 .6 17 .6 18 .6 19 .6 20 .6 21 .6 22 .6 23 .6 24 .6 25 .6 27 .6 28 .6	590 689 688 688 687 686 686 685	.863 .862 .861 .860 .859 .858	1,069 1,067 1,066 1,064 1,063	1.333 1.330 1.328 1.325 1.323	1.740 1.734 1.729 1.725	2.110 2.101 2.093 2.086	2.224 2.214 2.205 2.197	2.567 2.552 2.539	2.898 2.878 2.861	3,222 3,197 3,174	3.646 3.611 3.579	3.965 3.922 3.883
17 6 18 6 19 6 20 6 21 6 22 6 24 6 25 6 26 6 27 6 28 6	688 688 687 686 686 685	.862 .861 .860 .859 .858	1.067 1.066 1.064 1.063	1.330 1.328 1.325 1.323	1.734 1.729 1.725	2,101 2.093 2.086	2.214 2.205 2.197	2.552 2.539	2.878 2.861	3.197 3.174	3.611 3.579	3.922 3.883
18 6 19 6 20 6 21 6 22 6 23 6 24 6 25 6 26 6 27 6	688 687 686 686 685	.861 .860 .859 .858	1.064 1.063	1,328 1,325 1,323	1.729	2.093	2.205 2.197	2.539	2.861	3.174	3.579	3.883
20 6 21 6 22 6 23 6 24 6 25 6 26 6 27 6	687 686 686 685	.860 .859 .858	1.064 1.063	1.325 1.323	1.725	2.086	2.197					
20 6 21 6 22 6 23 6 24 6 25 6 26 6 27 6	686 686 685	.859 .858	1.053	1,323				2.528	2 845	2 152	3 557	3.850
21 .6 22 .6 23 .6 24 .6 25 .6 26 .6 27 .6 28 .6	686 685	.859 .858	34		1 771	วากอก			See Control			
23 6 24 6 25 6 26 6 27 6 28 6	685		1.061	and the second	471 444	LUGU	2.189	2.518	2.831	3.135	3.527	3.819
23 6 24 6 25 6 26 6 27 6 28 6				1.321	1.717	2.074	2.183	2.508	2.819	3.119	3.505	3.792
246 256 266 276 286			1.060	1.319	1.714	2.069	2.177	2.500	2.807	3.104	3.485	3:768
26 6 27 6 28 6	685	.857	1.059	1.318	1.711	2.064	2.172	2.492	2.797	3.091	3,467	3.745
26 6 27 6 28 6	684	856	1.058	1.316	1.708	2.060	2.167	2.485	2.787	3.078	3.450	3.725
28 6	684	856	1.058	1.315	1.706	2.056	2,162	2.479	2.779		3,435	3.707
28 6	684	.855	1.057	1,314	1.703	2.052	2,158	2.473	2.771	3.057	3.421	3.690
29 6	683	.855	1.056	1.313	1.701	2.048	2,154	2.467	2.763	3.047	3.408	3.674
	583	854	1.055	1.311	1.699	2.045	2.150	2.462	2.756	3.038	3.396	3,659
	683	.854	1.055	1.310	1.697	2.042	2.147	2:457	2,750	3.030	3.385	3.646
40 .6	681	.851	1.050	1.303	1.684	2.021	2,123	2.423	2,704	2.971	3.307	3.551
50 6	679	849	1.047	1,299	1.676	2.009	2.109	2.403	2.678	2.937	3,261	3,496
60 _6	679	.848	1.045	1.296	1.671	2.000	2.099	2.390	2.660	2.915	3.232	3.460
80 .6	678	.846	1.043	1.292	1.664	1.990	2.088	2.374	2.639	2.887	3,195	3.416
	677	.845	1.042	1.290	1.660	1.984	2.081	2.364	2.626	2.871	3,174	3.390
	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
Š	50%	60%	70%	80%	90%	95%	96%	98%	99%	99.5%	99.8%	99.9%