

淡江大學八十九學年度碩士班招生考試試題

系別：電機工程學系

科目：計算機概論(含計算機組織)

本試題共 2 頁

本
試
題
雙
面
印
製

1. (40 points) Explain the following terminologies as detail as possible:
 - (1) CSMA/CD
 - (2) E-commerce
 - (3) RISC
 - (4) context switch
 - (5) virtual memory
 - (6) branch prediction
 - (7) cache coherence
 - (8) MIMD computer

2. (10 points) In a computer system, we often utilize some compression techniques to minimize the data/file size before we storing it into external memory or transmitting it over networks. Please give *one* compression scheme and show how the compression scheme compresses data? (In your example, the derived data size after compressing must be smaller than that of original data.)

3. (10 points) A floating-point number is usually represented in a computer as consisting of a sign bit *S*, an exponent *E*, and a mantissa *M*. In the IEEE 754 standard, the true value of a 32-bit floating-point number (represented as 1-bit *S*, 8-bit *E*, and 23-bit *M*) is given by the following formula:

$$N = (-1)^S \times 2^{E-128} \times (0.1M),$$

where $0 \leq E \leq 255$. Note that the '1' in the true mantissa *0.1M* is omitted in the presentation, it is an implicit leading bit of the true mantissa. Please identify the expressible range of IEEE 754 standard.

4. (10 points) Write a recursive function for computing the binomial coefficient $C(n,m)$ as defined as follows :

$$C(n,m) = C(n-1, m) + C(n-1, m-1) \text{ or } C(n,m) = \frac{n!}{m! \times (n-m)!}$$

where $C(n,0) = C(n,n) = 1$.

◀ 注意背面尚有試題 ▶

淡江大學八十九學年度碩士班招生考試試題

系別：電機工程學系

科目：計算機概論(含計算機組織)

本試題共 2 頁

本
試
題
雙
面
印
製

5. (10 points) Consider a memory system with the following parameters

Cache access time : 15ns

Memory access time : 100ns

Let the size of cache be C Kbytes. If the relation between cache hit rate (H) and cache size (C) can be expressed as $H=0.6+0.1\times\log_2C$, for $1\leq C\leq 8$. What is the minimum cache size needed if we want the average cache size to be no more than 35ns ?

6. (10 points) Design a circuit that compares three 3-bit numbers, A, B and C, to check whether they are equal or not. The circuit has one output x, so that $x = 0$ if $A=B=C$, and $x = 1$, otherwise.

7. (10 points) To be a good or at least qualified researcher, you must have the ability to think carefully before you taking any action on one topic. This includes to find a *good* and *new* topic or to identify an already existing problem being crucially important but not yet been noticed. Please give an example of either (i) advanced application of computer network in the future or (ii) extremely crucial problem to be studied of computer network. You should give *technical reasons* for your proposal. Try your best to complete the complete the answer within 10 lines. (Note that only *NEW* idea will be accepted!)