

國立交通大學九十一學年度碩士班入學考試試題

科目名稱：計算機概論(053, 091, 731)

考試日期：91 年 4 月 20 日 第 3 節

系所班別：電控系計算機類，資訊科學系，電資專班資訊組

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A.單選題: 每題 1.5 分，答錯倒扣 0.3 分

- 1) Data will be most quickly available from
A)register B)memory C)tape D)disk E)CD ROM
- 2) A technique for protecting data sent over communications lines is called
A)encryption B) biometrics C)scanning D) spamming.
E)locking
- 3) A computer dedicated to deciding who gains entry to a company's network is called a
A)firewall B)cookie C)hot site D)DNS E)consortium.
- 4) The small programs that can provide animation on the Web are called
A) applets B)browsers C)processor D)engines E)hyperregions.
- 5) The standard way to transfer files on the Internet uses
A) Boolean B)IBM C)CERN D)FTP E) ARPA.
- 6) The birthplace of the World Wide Web is considered to be
A) the Department of Defense B)CERN C)ARPA
D)ICANN E) Netscape
- 7) When a message is sent over the Internet it is divided into
A)pages B)packets C)bits D)plug-ins E)sites.
- 8) URL stands for
A) Uniform Resource Level B)Usenet Resource Location. C)Uniform
Resource Locator D)United Region Location E)Universal Resource Level
- 9) Which is not output from the compiler?
A) load module B)source program listing
C)diagnostics D)object module
- 10) The module that is executed by the computer is the
A) link module B)load module C) object module D)source module.
- 11) A type of fourth-generation language used for retrieving data from databases is
A) C B)FORTRAN C) XML D)Pascal E)query.
- 12) After a database design has been conveyed to the computer software ,the next step to building the database is to
A) choose the data model B)choose the DBMS
C)compare data columns D)enter the data E)consult the expert
- 13) When a user sees only the response to a request without being made aware of the details of how it came about, a computer activity is said to be
A)structured B)compared C)clear D)transparent E)modeled
- 14) The type of database model that organizes data in rows and columns is
A)operational B)flat C)relational D)network E)hierarchical.
- 15) A set of programs that permits the computer to control and manage its own resources

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is called a(n)

A)operating system B)environment C)debugger D)manager E)controller.

16) The process of loading the operating system into memory is called

A)interfacing B)booting C)prompting D)startup E)firing

17) Programs running in the same time frame are considered

A)simultaneous B)commands C)pull-down menus D)concurrent.

18) Operating systems for large computers permit concurrent running of many unrelated programs by using

A)multiprogramming B)a shell
C)operating environment D)service programs.

19) Large computers may divide memory into areas, of which the foreground area is used for

A)programs that use paging. B)programs with high priority.
C)programs with low priority. D)programs that are large.

20) The name of the operating system program that controls all operating system activities is the

A)boot. B)supervisor. C)GUI. D)queue E)I/O

21) The windows feature that lets the computer reconfigure itself when new hardware is added is called

A)Start. B)interfacing. C)plug and play. D)open E)booting.

22) The process of writing a print file temporarily on disk is called

A)screening. B)page table. C)time-sharing. D)spooling. E)time-sharing

23) In paging, the operating system keeps track of where pages are by using a

A)page utility. B)page table. C)page schedule D)page frame.

24) When a computer has more than one central processing unit and can thus run multiple programs simultaneously, this is called

A)time-sharing. B)an operating environment.
C)multiprogramming. D)multiprocessing.

25) A language that is more precise than English but less precise than a formal programming language is

A)translator. B)FORTRAN. C)Pascal. D)XML E)pseudocode

26) Mistakes in a program that involve the improper use of the programming language are called

A)syntax errors. B)attributes. C)diagnostics. D)logic errors.

27) A general term that refers to connecting two or more computers and their resources via communications equipments is

A)token. B)network. C)topology. D)workstation. E)clustering

28) In which kind of network do all computer have equal status and share files and

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peripheral devices?

A)bus. B)star. C)WAN. D)peer-to-peer. E)MAN

29) The substitution of data communications and computers for the commute to work is called

A)e-mail. B)telecommunications.
C)teleconferencing. D)telecommuting.

30) Using several disk packs together to work as a unit is called

A)RAID. B)cylindrical. C)DAT. D)DVD. E)FLUSH

31) A hybrid disk that has the high capacity of an optical disk but can be written over as a magnetic disk is called

A)WORM. B)redundant array. C)magneto-optical. D)helical.

32) A set of parallel data paths to transport data internally in the computer system is called a

A)transistor. B)bus line. C)cache. D)ALU E)picosecond.

33) The combination of I-time and E-time is called

A)cache cycle. B)computer time C)machine cycle D)machine time.

34) The American standard code for representing characters with bits is

A)ASCII. B)binary digits. C)semiconductor storage. D)a gigabyte.

35) Data and instructions are brought into memory from an input device by

A)flash memory. B)the control unit. C)the ALU. D)ROM burners.
E)register

36) A plug-in board of memory chips is called a

A)cache. B)MHz. C)PROM. D)SIMM.

37) Conventional computers with complete instruction sets are referred to as

A)RISC. B)SIMM C)SRAM. D)ASCII. E)CISC

38) A file that contains changes to be made to the master file is the

A)secondary file. B)auxiliary file. C)temporary file D)transaction file.

39) Applying a formula to a record key to obtain a disk address is called

A)transacting. B)indexing. C)hashing. D)sequencing.

40) For processing to be real-time it must also be

A)batch. B)online C)auxiliary. D)optical. E)distributed

B.Problems 1~5: 40 points

(10 subproblems; 4 points for each subproblem)

1 Consider the following C++ implementation of mergesort which sorts the elements in `a[1..h]` into nondecreasing order.

```
void msort(int* a,int l,int h)
```

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```
{
    if (l<h) {
        int m=(l+h)/2;
        msort(a,l,m); msort(a,m+1,h); merge(a,l,m,h);
    }
}

void merge(int* a,int l, int m,int h)
{
    int* b;
    allocate storage for *b here
    int i=l,j=m+1,k=1;
    while (i<=m&& j<=h)
        if (a[i]<a[j]) { b[k]=a[i]; i++; k++; }
        else { b[k]=a[j]; j++; k++; }
    for (k=m;k>=i;k--) { j--; a[j]=a[k]; }
    for (i=1;i<j;i++) a[i]=b[i];
    deallocate the storage pointed to by b here
}
```

Read the **merge** procedure carefully and answer the following questions.

- a) Write C++ code (using **new** and **delete**) to allocate and deallocate storage for ***b**. The amount of storage allocated should not exceed the maximum size required.
- b) Which is *not* a worst-case input for this implementation of mergesort?
 - ① 8, 1, 3, 2, 7, 4, 6, 5
 - ② 8, 3, 5, 1, 7, 2, 6, 4
 - ③ 8, 5, 6, 3, 7, 1, 4, 2
 - ④ 8, 1, 5, 2, 7, 6, 4, 3
- c) Let $C(n)$ = the number of worst-case inputs of n distinct elements for this implementation of mergesort
Write a recurrence for $C(n)$. (Don't solve it.)

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2 The following program is meant to compute $m \times (m+1) \times \cdots \times n$, $m \leq n$ in an unusual manner. But it contains an error. Find and correct the error. (DO NOT rewrite the entire program; just show the erroneous code.)

```
void p(int m,int n)
try
{
    if (m==n) throw 1; else p(m+1,n);
}
catch(int x) { x*=m; throw; }

int main()
{
    try { p(1,6); } catch(int x) { cout << x; }
    return 0;
}
```

3 Consider the following class hierarchy

```
struct Z
{
    virtual void s();
};
struct A : virtual Z {
    virtual A& p();
    void q();
    void r();
};
struct B : virtual Z {
    virtual void s();
private:
    void r();
};
struct C: A,B
{
    virtual C& p();
    void q();
    virtual void s(int);
}
```

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};

- a) Which functions will be called in the following code?

```
A& ra=*new C;  
ra.p().q();  
ra.s();
```

- b) The call

```
(new C)->r()
```

has two candidates `A::r()` and `B::r()`.

However, `B::r()` is private and so invisible in class `C`.

On the other hand, `A::r()` is public and so visible in class `C`.

Hence, it might seem that `(new C)->r()` should call `A::r()`.

Nevertheless, the call is ambiguous in C++.

Why doesn't C++ resolve the call to `A::r()`?

- 4 Consider the following C++ code

```
void p(int n,int k)  
{  
    static vector<int> a;  
    if (n==0) {  
        for (int i=0;i<a.size();i++) cout << a[i];  
        cout << endl;  
    } else if (n>0&& k>0) {  
        p(n,k-1);  
        a.push_back(k);  
        p(n-k,k);  
        a.pop_back();  
    }  
}
```

- a) Show the output produced by the call `p(5,4)`.
b) Rewrite the code for outputting the vector `a` using iterator.
(DO NOT rewrite the entire function; just show the related code.)

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5 Consider the following class

```
class Int
{
public:
    Int(int x) : p(new int(x)) {}
    const Int operator+(const Int& rhs)
    { return Int(*p+*rhs.p); }
private:
    int* p;
};
```

- a) Why should `operator+` return a const object, rather than a non-const object?
- b) Define `operator<<` so that the code
 `cout << Int(2002) << endl;`
displays 2002 in one line.
(DO NOT reproduce the entire class; just show the related code.)