

國立中山大學 106 學年度碩士暨碩士專班招生考試試題

科目名稱：計算機概論【資管系碩士班甲組、乙組】

題號：442001

※本科目依簡章規定「不可以」使用計算機(混合題)

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單選題，每題 4 分

1. The _____ works with one source statement at a time, reading it, translating it to machine-level, executing the resulting binary instructions, and then moving on to the next source statement.
A. compiler
B. non-procedural language
C. interpreter
D. none of the above
2. The dynamic binding is a mechanism that a function being called is looked up at _____.
A. Compile time
B. Link time
C. Load time
D. Execution time
3. Recursion is memory-intensive because _____.
A. it must occur numerous times before it terminates
B. previous function calls are still open when the function calls itself and the arguments of these previous calls still occupy space on the call stack
C. many copies of the function code are created
D. it requires large data values
4. The maximum number of comparisons needed for the binary search of a 2000 element array is
A. 9
B. 15
C. 11
D. 14
E. 10
5. What is the subnet number of the IP address 140.117.17.224 with the subnet mask 255.255.255.128?
A. 140.117.0.0
B. 140.117.17.0
C. 140.117.17.128
D. 140.117.17.224
E. 140.117.17.255
6. The source port identifier tells the destination station _____.
A. which computer sent the TCP packet.
B. which application layer process the packet is from.
C. the IP address of the source computer.
D. the IP address of the destination computer.
7. The Transmission Control Protocol uses _____ so that the destination station can reassemble the packets into the correct order.
A. addresses
B. sequence numbers
C. port numbers
D. subnet mask

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8. Which of the following is not a function of the transport layer?
 - A. End-to-end delivery of the message
 - B. Taking messages from the application layer
 - C. Routing
 - D. Breaking long messages into smaller packets
9. On average, the quicksort is an algorithm in which of the following classes?
 - A. $\Theta(\lg n)$
 - B. $\Theta(n)$
 - C. $\Theta(n \lg n)$
 - D. $\Theta(n^2)$
10. Which of the following is not a step in the process of compiling a program?
 - A. Lexical analysis
 - B. Parsing the program
 - C. Executing the program
 - D. Code generation
11. Which of the following is a First In First Out structure?
 - A. Array
 - B. Stack
 - C. Queue
 - D. Tree
12. If a program attempts to modify the contents of memory locations that do not belong to it, the operating system's _____ routine intervenes and terminates the program.
 - A. reliability
 - B. security
 - C. processor management
 - D. memory protection
13. When a virtual address points to a page that is not in physical memory, a(n) _____ is recognized and a swap-in operation begins.
 - A. interrupt
 - B. page fault
 - C. polling signal
 - D. page interrupt
14. _____ occurs when two or more programs each control a resource needed by the other.
 - A. Polling
 - B. An interrupt
 - C. Deadlock
 - D. Spooling
15. _____ occurs when the system finds itself spending so much time swapping pages into and out from memory that little time is left for useful work.
 - A. Spooling
 - B. Thrashing
 - C. An interrupt
 - D. A polling signal

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16. Given the relation X below:

X:	A	B	C
	2	5	7
	3	3	3
	4	4	2
	5	2	8

What value will be retrieved by the following query?

TEMP ← SELECT from X where B = C

RESULT ← PROJECT B from TEMP

- A. 2
- B. 3
- C. 4
- D. 5

問答題，每題 6 分

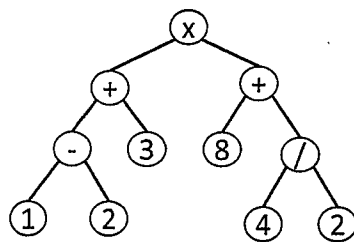
1. Please briefly define the following terms and explain the differences between them. Give examples if you would like.

- a) In-memory Computing vs. In-database Computing
- b) NoSQL databases vs. NewSQL databases

2. Please briefly define the following terms in Functional Programming Languages. Give examples if you would like.

- a) Higher-order functions
- b) Closure

3. What is the output of a post-order traversal of the below tree?



4. Suppose that k is an integer array starting at memory address 5000, $kPtr$ is a pointer to k , and each integer is stored in 8 bytes of memory, what location does $kPtr + 5$ point to?

5. Please write a C function `concat(str1, str2, out)` that concatenates two given strings, `str1` and `str2`, and store the result into the new variable `out`. For example,

```
concat("foo", "bar", out);
```

will replace the variable `out` with `"foobar"`. Please DO NOT use any string manipulation functions in C Standard Library.

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6. Consider a relation $R(A,B,C,D,E,F)$ and a set of functional dependencies

$FD = \{A \rightarrow CD, C \rightarrow BE, B \rightarrow F, F \rightarrow A\}$ that hold on R . Please

- a) find at least 2 candidate keys of R .
- b) use Armstrong axioms to show that $A \rightarrow BF$ also hold on R .