

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0301，節次：2

1. Explain the following terminologies that are used in information technology. (20%)
(a) Proxy server; (b) Mobile agent; (c) DLL; (d) Router.
2. Why abstract data type is usually used in discussing data structures or programming languages? Give an example for a **stack** abstract data type written in C-style notation. (15%)
3. Both waterfall-model and V-model are software development models introduced in software engineering theme. Describe them briefly and compare their properties, respectively. (15%)
4. Assume an array **A** contains **n** integers. The following pseudocode is used to sort the elements of **A** by heapsort approach. The procedures **BUILD_HEAP(.)** and **HEAPIFY(.)** are used to build and modify a heap, respectively. Find the time complexity for **each statement** of the pseudocode and the **total complexity** of the algorithm. (10%)

```
Algorithm HEAPSORT(A, n)
  BUILD_HEAP(A, n)
  for i ← n downto 2
    do exchange A[1] ↔ A[i]
    HEAPIFY(A, 1, i-1)
```

5. For each of the following statements, give your answer in **true** or **false** with a short explanation for supporting the given answer. (20%)
 - (a) From the definition view of algorithm, operating system is an algorithm.
 - (b) An application programming interface (API) is a source code interface that a library, not operating system, provides to support requests for services to be made of it by computer programs
 - (c) Flash memory is non-volatile, solid-state storage. It is a specific type of EEPROM that is erased and programmed in large blocks.
 - (d) Both of Wi-Fi and WiMAX use same protocol IEEE 802.11.
6. Use C or C++ computer programming language to implement a program to merge two sorted sequences into one sequence (your program must be self-readable). (20%)