臺灣綜合大學系統115學年度學士班轉學生聯合招生考試試題

科目名稱	計算機概論	類組代碼	B30.D33
		科目碼	B3091

※本項考試依簡章規定所有考科均「不可」使用計算機。　　本科試題共計 1 頁

每題 10 分

1. Please explain the differences and usage of ROM, RAM, SDRAM. Please use a table with three columns, one for the name of storage, the second for the difference, and the last for the usage, in your answer.
2. For each of the following data structure, a. queue, b. stack, c. linked-list, d. circular queue, and e. B-tree, please list one business application whose basic data storage adopts it, and list the reason why the application adopts that data structure. Please use a table with three columns, one for the name of data structure, the second for the business application, and the last for the reasons, in your answer.
3. For each of the following sorting algorithms, a. binary sort, b. bubble sort, c. shell sort, d. quick sort, e. heap sort, please list their individual concept, and what situation that sorting algorithm will get the worst case. Please use a table with three columns, one for the name of sorting algorithm, the second for the concept, and the third for the worst situation, in your answer.
4. For the following C-like codes, please write its output from two print statements.

```
void static main() {
  int w, x, y;
  w = 3; x = 10; y =20;
  x = sub1(y); print 'x = ', x, '\n';
  x = sub1(x); print 'x = ', x, '\n';
  …}
```

```
int sub1(int x) {
 static int w = 7;
 w = x + w;
 return w;
}
```

5. For an undirected graph with six nodes, {A, B, C, D, E, F}, and seven edges, {(A, E), (A, C), (B, D), (B, E), (C, D), (D, F), (D, E)}. Assume we visit the graph from node A. Please show the visit sequence of nodes with breadth-first-search, and depth-first-search, to visit all nodes. Note that one node appears only once in your answer if the node is popped up from the stack or queue.
6. For a sequence of data, (18, 20, 35, 9, 6, 12), please construct an AVL-tree from the null tree to the whole tree. You need to draw the construction of the tree one step by one step (i.e., redraw the tree after each new data is inserted into the tree).
7. For the following expression represented in infix, (-A+B)*C-D*E/(F+G), please transfer it to postfix, and write its algorithm or codes, transferring infix to postfix.
8. In TCP protocol, it provides fault-detect, fault-recover, etc. mechanisms to solve the unreliable transmission problem. The mechanisms can be acknowledge, timer, sequence number, hand-shaking, re-send. For each of the above mechanism, please explain how they work and what daemons (the errors the transmission encountered) it is to conquer. Please use a table with three columns, one for the name of mechanism, the second for how their work, and the last for the daemons to conquer.
9. Please transform the unnormalized table into the 3th normal form table.

Student ID	Courses	Required	Number of Courses
007	DB, MIS, Network	R, R, O	3
008	DB, Big Data	R, O	2
010	OOP, Big Data, MIS	R, O, R	3

where R: required, O: optional; 'number of courses' means how many courses the student takes

10. For the accumulation from 1 to n, i.e., 1 + 2 + 3 + 4 +…+ n, please write its program without /with recursive function call. That is, you need to write two programs, one without recursive call, the other with recursive call.