中原大學 100 學年度 碩士班 入學考試

3 月 19 日 15:30~17:00　　工業與系統工程學系甲組　　誠實是我們珍視的美德，
我們喜愛「拒絕作弊，堅守正直」的你！

科目：　計算機概論　　　　　　　　　　　　　　　　（共 3 頁第 1 頁）

□可使用計算機，惟僅限不具可程式及多重記憶者　　☒不可使用計算機

I. Short Answers (5 Points each; total 30 Points)

1. What is the definition of "algorithm"?

2. What is the definition of "overflow" in data storage?

3. What is the definition of "normalization" in database?

4. What is a "protocol" in computer networking?
.
5. Given two integers in **hexadecimal**, AD_{16} and BC_{16}, please use the bitwise **AND** operator on those two integers and give the final answer in **decimal** number. Please show your calculation steps.

6. What is the main difference between **UDP** and **TCP** protocols in computer networking?

II. Interpret Outputs from Pseudocodes (30 Points)

7. Given the following *pseudocode*, what are the output values for variables **A**, **B**, **C**, **D**, and **E** at the end of the *pseudocode*? (**20 Points**)

```
BEGIN
    A := 2;
    B := 5;
    C := 10;
    D := 0;


    A := A + B * A - C / A;


    E := A;


    B := (A + B) * (A - (C / A));
END.
```

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科目：　計算機概論　　　　　　　　　　　　　　　　（共 3 頁第 2 頁）

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8. Given the following *pseudocode*, what are the <u>output values</u> for variables **x** and **y** at the end of the *pseudocode*? (**10 Points**)

```
BEGIN
    x:= 0;
    y:= 1;


    WHILE (x < 3)
    BEGIN
        IF (x <= 2 and y < 2) THEN
        BEGIN
            y := y + 1;
        END;
        ELSE
        BEGIN
            y := y + 2;
        END;
        x := x + 1;
    END;
END.
```

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科目： 計算機概論　　　　　　　　　　　　　　　（共 3 頁第 3 頁）

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III. Programming Problems: please write programs in a language of your choice (specify which language) for the following programming problems. (40 Points)

9.　Write an application that performs the basic ATM functionalities: **(20 Points)**

1. **The ATM application allows the user to select from four choices: (1) Deposit, (2) Withdraw, (3) Balance, (4) Quit**
2. **For DEPOSITS, the program will prompt for an amount, add the deposit amount to the customer's balance and print the new balance.**
3. **For WITHDRAWALS, the program will prompt for an amount, subtract the withdrawal amount from the customer's balance and print the new balance.**
4. **For a BALANCE inspection, the program simply displays the current balance.**
5. **When the customer chooses to QUIT, the program will print "Good Bye!!!".**
6. **The ATM menu will show up repeatedly until the customer chooses to quit.**
7. **The beginning balance in the ATM account is $100.**

Output looks like the following:

```
(1)Deposit, (2)Withdraw, (3)Balance, or (4)Quit: 1
Enter amount to deposit: 90
Your new balance is $190


(1)Deposit, (2)Withdraw, (3)Balance, or (4)Quit: 2
Enter amount to withdraw: 50
Your new balance is $140


(1)Deposit, (2)Withdraw, (3)Balance, or (4)Quit: 3
Your new balance is $140


(1)Deposit, (2)Withdraw, (3)Balance, or (4)Quit: 4
Good Bye!!!
```

10.　Write an algorithm for implementing the binary search. **(20 Points)**