中原大學 102 學年度 碩士班 入學考試

102/3/2 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 4 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

Short-Answer Questions (5 Points each; total 30 Points)

1. What are the four elements of the counter-controlled repetition (or loop)? Please give an example of the counter-controlled repetition (pseudocode or program fragment).

2. What is an "infinite" loop in terms of computer programming? What are the causes for an "infinite" loop to occur?　Please list three causes.

3. Please complete the following truth tables by filling in the blanks with **T**rue or **F**alse in the last two columns:

A	B	not A or B	not (A and B)
T	T		
T	F		
F	T		
F	F		

4. What are the three basic control structures of computer programming?

5. What is the definition of a *variable* in computer programming languages? What are the four properties that each *variable* in a program possesses?

6. What are the advantages for using subprograms (also called subroutine/module/function/method) in the computer programs? Please give three advantages.

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科目： 計算機概論

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7. Given the following *pseudocode*, what are the output values for variables *a*, *b* and *c* at the end of the *pseudocode*? Suppose that the function `func` `arguments` are passed by value. (10 Points)

```
program main()
begin
  integer a, b, c
  a = 10
  b = 8
  c = 3
  b = func(a, b, c)
  a = a % c     // % is the modulo operator
  print a, b, c
end

integer func(integer x, integer y, integer z)
begin
  integer i = 1

  while i <= x do
  begin
     if (i > 5) then
        y = y + i
     i = i + 1
  end
  z = y - x
  return x + y + z
end
```

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科目： 計算機概論 　　　　　　　　　　（共 4 頁第 3 頁）

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Programming Problems: please create programs in a language of your choice (†specify which <u>computer language</u>) based on the following problem descriptions. Please add <u>comments</u> in the programs for clarity.

8. Create a program that estimates the adult height of a child based on the following formula, with parents' heights as the inputs **(30 Points)**:

Boy's adult height: $\dfrac{\text{(Father's Height + Mother's Height + 13)}}{2}$

Girl's adult height: $\dfrac{\text{(Father's Height - 13 + Mother's Height)}}{2}$

The height unit is in centimeters (cm). The program will take the child's name, gender of the child (boy or girl), the height of the father in cm, and the height of the mother in cm as inputs. The program will output the estimated adult height in cm. The program will allow the user to enter a new set of values and get the predicted height until the user decides to quit.

The **sample output** is displayed below:

```
Please enter the child's name: John
Please enter the child's gender (M (male) F (female)): M
Please enter the father's height in centimeters: 182
Please enter the mother's height in centimeters: 170
The estimated height for John is 182 cm
Do you want to continue? (Y - Yes / N - No)): Y


Please enter the child's name: Mary
Please enter the child's gender (M (male) F (female)): F
Please enter the father's height in centimeters: 175
Please enter the mother's height in centimeters: 155
The estimated height for Mary is 158 cm
Do you want to continue? (Y - Yes / N - No)): N
```

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科目： 計算機概論 　　　　　　　　　　（共 4 頁第 4 頁）

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9. Create a program that performs the following tasks for handling student's grades **(30 Points)**:

(1) Store the following students' grades in an integer array:

15, 98, 63, 21, 56, 78, 100, 59, 88, 70, 11, 0, 46, 33, 60

(2) Sort the students' grades ranked from the highest to the lowest grade.

(3) Convert students' grades from number grades to letter grades:

90-100:	A
80-89:	B
70-79:	C
60-69:	D
Below 60:	F

The **sample output** is displayed below:

```
Grades Before Sorting: 15 98 63 21 56 78 100 59 88 70 11 1 46 33 60
Grades After Sorting: 100 98 88 78 70 63 60 59 56 46 33 21 15 11 1
Conversion to Letter Grades: A A B C C D D F F F F F F F F
```