淡江大學 109 學年度日間部寒假轉學生招生考試試題

系別：資訊工程學系三年級　　科目：程式語言 35 — 35

考試日期：1 月 18 日(星期一) 第 2 節　　本試題共 5 大題， 3 頁

本試題雙面印刷

1. (25%) Modify the following code to produce the output shown below. Use proper indentation techniques. You may not make any changes other than inserting braces. Note: it is possible that no modification is necessary; or there is no way to create the output as requested. In either case, you still need to write down you answer with reasons.

(Note: 下列程式碼不能改變，僅能加大括弧，得到(a)~(e)題所要的輸出)

```
if (y == 8)
if (x == 5)
printf("@@@@@\n");
else
printf("#####\n");
printf("$$$$$\n");
printf("&&&&&\n");
```

(a) Assume x = 5 and y = 8, the following output is produced.

```
@@@@@
$$$$$
&&&&&
```

(b) Assume x = 5 and y = 8, the following output is produced.

```
@@@@@
```

(c) Assume x = 5 and y = 8, the following output is produced.

```
@@@@@
&&&&&
```

(d) Assume x = 5 and y = 7, the following output is produced.

```
#####
$$$$$
&&&&&
```

(e) Assume x = 5 and y = 7, output nothing.

2. (20%) For computing 1+2+3+...+n, give a function
   (a) sum(x) using iteration method (用正常的 for 迴圈)
   (b) rsum(x) using recursion method (用遞迴)

背面尚有試題

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系別：資訊工程學系三年級　　科目：程式語言　　25-2

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3. (10%) What does the function mystery do? If $n = 2468$ is passed to mystery, what is the return value?

```
int mystery(int n){
  int r = 0, divisor = 1000, multiplier = 1;
  while ( n > 10 ) {
  if ( n >= divisor ) {
  r += n / divisor * multiplier;
  n %= divisor;
  divisor /= 10;
  multiplier *= 10;
      } else
      divisor /= 10;
  }
  r += n * multiplier;
  return r;
}
```

4. (15%) Input two integers N1 and N2, write three functions below to get the desired results.
   (a) compare(N1,N2), return 0 if N1=N2, return 1 if N1>N2, return -1 if N1<N2
   (b) checkEven(N), return 1 if N is even, return 0 if it is odd
   (c) prime(N), return 1 if N is a prime (質數), return 0 if it is nonprime

Note: You need to call the three functions to defined above to obtain the results below.

```
Enter two integers: 10 31
10 < 30
10 is even; nonprime    // 10 是偶數，非質數
31 is odd; prime        // 31 是奇數，質數

Enter two integers: 53 26
53 > 30
53 is odd; prime
35 is odd; nonprime

Enter two integers: 25 25
25 = 25
25 is odd; nonprime

Enter two integers: -1 -1 // 有輸入 -1，離開
```

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5. (30%) The given code below is to throw the dice N times in random, and show the statistics. The dice number is from 1 to 6. Based on the code given, without modifying the main() functions, give the five functions in order to produce the desired result.
   (a) randgen(int dice[], int N): throw the dice N times in random
   (b) show(int dice[], int N): show the N dice numbers, ten numbers in a row
   (c) compute(int dice[], int count[]): to get the number in the dice array and count the number and record it in the count array.
   (d) statistics(int dice[]): show the dice count as shown below.
   (e) check(int count[], int N): show if the count total is equal to N

   Note: 以上 5 個 functions 定義明確，程式碼可以單獨撰寫，每個 funciton 配分 6 分。

```
#define MAX 200

int main(){
  int dice[MAX];      // 儲存亂數丟骰子之數字
  int count[6];       // 儲存 1~6 出現次數
  int N;
  printf("Enter N: ");
  scanf("%d",&N);
  randgen(dice, N);  // 投骰子，亂數產生生 N 次(介於 1~6)
  show(dice,N);      // 顯示 N 個骰子值，每一列呈現 10 個成績
  compute(dice,count) // 統計 dice[]數字 1~6 出現次數，紀錄在 count[]中
  statistics(dice);   // 顯示示數字 1~6 各出現多少次
  check(count, N);       //  計算 count[]陣列 1~6 數字之加總是否值等於 N 值
}

/* screen output */

Enter N: 50

1 6 3 4 5 4 3 1 2 6  // 呼叫 randgen(dice,N) & show(dice, N) 時印出
2 4 1 5 3 2 5 6 2 1
4 2 1 4 4 5 2 5 6 2
2 4 6 3 5 1 3 2 4 5
3 1 3 2 5 3 2 1 6 4

Statistics Summary   // 以下呼叫 statistics(dice) 時印出

[1] ******** (8)
[2] ********** (11)
[3] ******** (8)
[4] ********* (9)
[5] ******** (8)
[6] ****** (6)

Total = 8+11+8+9+8+6 = 50  // 呼叫 check(count)時印出
Verify: OK.  // 這是因為數字 1~6 加總等於 N 值，因此印 OK. 否則印 NOT OK.
```