1. (30%) 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: 程式碼不能改變，僅能加大括弧，得到所要的輸出)

   ```
   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 *sum(n)=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)

3. (10%) Show the output of the following program.

```c
void tower(int N, char from, char aux, char to){
  printf("(%d,%c,%c,%c)\n", N,from,aux,to);
  if(N==1){
    printf("%c -> %c\n", from, to);
  }else{
    tower(N-1,from,to,aux);
    printf("%c -> %c\n", from, to);
    tower(N-1,aux,from,to);
  }
}
int main(){
  tower(N,'3','2','1');
  system("pause");
  return 1;
}
```

4. (10%) What does the function mystery do? If $n = 2468$ is passed to mystery, what is the return value?

```c
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;
}
```

5. (10%) Write a program to input the hours, minutes, and seconds, and convert it to total seconds.

Screen output:

```
Enter hour: 2
Enter minutes: 10
Enter seconds: 20
02:10:20 = 7820 seconds
```

6. (10%) Write a program to generate a number between 1 to 10 in random, and guess based on the times allowed. Please follow the output given below.

```
Randomly generate a number between 1 and 10.
Enter times: 4    //表示允許猜的次數
[1] => 7
    Wrong, guess again.
[2] => 2
    Wrong, guess again.
[3] => 9
    Wrong, guess again.
[4] => 1
    You lost after 4 tries. The number is 5.   // 4 是變數

Randomly generate a number between 1 and 10.
Enter times: 3
[1] => 5
    Wrong, guess again.
[2] => 4
    You are right. You win in 2 tries.   // 2 是變數

Enter N (-1 to exit): -1
```

7. (10%) Write a program to list all prime numbers between two positive integer numbers, based on the output below. You can choose to use the partial program given below or by you own.

```c
int findPrimes(int primes[], int N1, int N2){   // Assuming N1 <= N2
    int count=0;

    return count;   // 質數個數
}

int main(){
    int primes[100]={0};
    int count;
    // intput N1, N2
    count = findPrimes(primes, N1, N2);
    // print the results
}

// screen output

Enter N1, N2: 10 40
8 primes between 10 and 40
==> 11 13 17 19 23 29 31 37

Enter N1, N2: 2 50
15 primes between 2 and 50
==> 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47

Enter N1, N2: 0 0
Bye~
```