

1. Fib(n) is a Fibonacci sequence. Please write a pseudocode using recursion to calculate Fib(n) if Fib(1)=1, Fib(2)=1 and n=1.....N.

```
int Fibonacci (int n)
    If n = 1
        return 1
    Else if n = 2
        return 1
    Else
        return Fibonacci (n - 1) + Fibonacci(n - 2)
End
```

2. Please write a pseudocode (bubble sort) to arrange a number list in ascending order. It should be noted that the comparisons between numbers are from the last element of the number list, data[1...n].

```
Function bubbleSort(Type data[1...n])
    Index i, j
    For i from 1 to n - 1 do
        For j from n to i + 1 do
            If data[j - 1] > data[j] then
                Exchange data[j] and data[j - 1]
        End
    End
End
```

3. Write a pseudocode based on the following sort: data[1...n].

6 3 1 7

6 3 7 1 pass 1

6 7 3 1 pass 2

7 6 3 1 pass 3

```

Function bubbleSort(Type data[1...n])
    Index i, j
    For i from 1 to n - 1 do
        For j from 1 to n - i do
            If data[j] < data[j + 1] then
                Exchange data[j] and data[j + 1]
        End
    End
End

```

```

Function selectionSort(Type data[1...n])
    Index i, j, min
    For i from n to 2 do
        min = i
        For j from i - 1 to 1 do
            If data[j] < data[min] then
                min = j
            End
        End
        Exchange data[i] and data[min]
    End
End

```

4. Write a pseudo code to conduct binary search using iterative method.

```

Function binarySearch (Type data[1...n], Type search)
    Index low = 1
    Index high = n

    while low <= high do
        Index mid = (low + high) / 2
        If data[mid] = search then
            return mid
        Else if data[mid] > search then
            high = mid - 1
        Else if data[mid] < search then
            low = mid + 1
        End
    End

    return NotFound
End

```

5. Based on the following sort, please fill in the answers in the following pseudo codes.

3 5 4 2 1

1 3 5 4 2 pass 1

1 2 3 5 4 pass 2

1 2 3 4 5 pass 3

1 2 3 4 5 pass 4

```
Function bubbleSort(Type data[1...n])
    Index i, j
    For i from 1 to n - 1 do
        For j from n to i + 1 do
            If data[j - 1] > data[j] then
                Exchange data[j] and data[j - 1]
        End
    End
```

6. Based on the following sort, please fill in the answers in the following pseudo codes.

5 4 2 7 6

5 4 2 6 7 loop 1

5 4 2 6 7 loop 2

2 4 5 6 7 loop 3

2 4 5 6 7 loop 4

```
Function selectionSort(Type data[1...n])
    Index i, j, max
    For i from n to 2 do
        max = i
        For j from i - 1 to 1 do
            If data[j] > data[max] then
                max = j
            End
        End
        Exchange data[i] and data[max]
    End
```

7. Please sort the following number list based on the following pseudo codes.

Function insertionSort(Type data[1...n])

Index i, j

Type value

For i from n - 1 to 1 do

value = data[i]

j = i + 1

While j <= n and data[j] > value do

data[j - 1] = data[j]

j = j + 1

data[j - 1] = value

End

Number list = [2 4 5 3 1]

2 4 5 3 1

2 4 5 3 1 loop 1

2 4 5 3 1 loop 2

2 5 4 3 1 loop 3

5 4 3 2 1 loop 4

8. Illustrate and explain the life cycle of a process in English.

(參考講義圖片說明)