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

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

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
```

```
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

                Exchange data[i] and data[min]
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

        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
```

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

                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)