""FP""OOP""

Object-Oriented Programming

""""" Pascal"""""recordstructure""map

 point.x x point

""""

```
struct Point {
  double x;
  double y;
}
```

 point.x point.y X Y ""

```
struct Point {
  double r;
  double angle;
}
```

 point.r point.angle Point XY point.x, point.y X Y Point point.x point.y

"""""indirection"" point.xpoint.y x y .x .y .x .y "" point.x point.y getter r angle x y x y

 Python "[property]" point.x point.y Java point.getX() point.getY() ——""

"" 10 point.x """"

"""""""Everything is an Object""method""static method""

""""

""Flat Earth Theory

 JavaScript constructor this this"bind"Python global "" nonlocal Ruby lambda ......

"""" OO X X "" OO OO Y Y Z...... Smalltalk O O OO

 Smalltalk Smalltalk """......"

Functional Programming

 HaskellScala

""first-class 1, 2, "hello"true...... """"design pattern first-class function

""white elephant

"white elephant"

""""pure"""""foldcurryingmaybe type

"" C

```
int f(int x) {
    int y = 0;
    int z = 0;
```

```
    y = 2 * x;
    z = y + 1;
    return z / 3;
}
```

"" Haskell

""

""""list

Lisp list"" length append O(n)"Lisp" append $O(n^2)$ cons reverse

 cons + reverse ...... ""

 Lisp list Lisp Indiana Scheme Lisp R. Kent Dybvig Scheme Chez Scheme AST list Kent " Chez Scheme Chez Scheme 700 5 " Chez Scheme Chez Scheme listChez Scheme

""""flip-flop"" WiFi4G Bluetooth""

""GC GC

fold

 fold [currying](#) fold ""fold list"" fold

Fold fold fold fold fold "" Haskell

```
foldr (+) 0 [1,2,3]
```

 `[1,2,3]` sum `[1,2,3]` fold + + 0 + 0 +, 0, `[1,2,3]`

 `sum` `sum [1,2,3]` `sum` fold fold fold

 fold [currying](#)Hindley-Milner

1. foldfold ""

2. [currying](#) lambda

3. Hindley-Milner HMHM unification Unification ""equivalence relationsubtypingsymmetry

4. algebraic data type"" Java sum type union type""

5. Tuple tuple Haskel l `(1, "hello")` `(Int, String)` tuple C structure tuple tuple Tuple tuple tuple 2

6. lazy evaluation bottom CPU

7. forwhile"" break continue

" vs """ shell script Unix ""

""""

" vs """

""""""

""programming"""""Programming Languages""""""""

"""""" monad Java design pattern

""