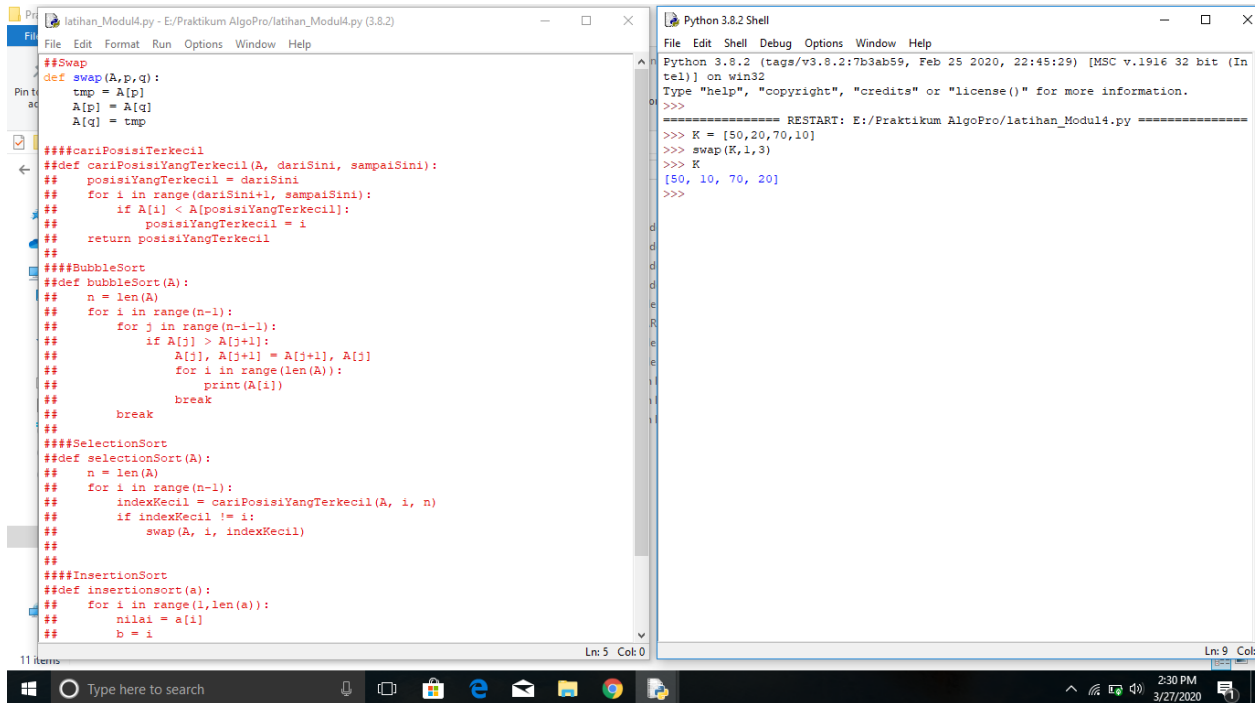


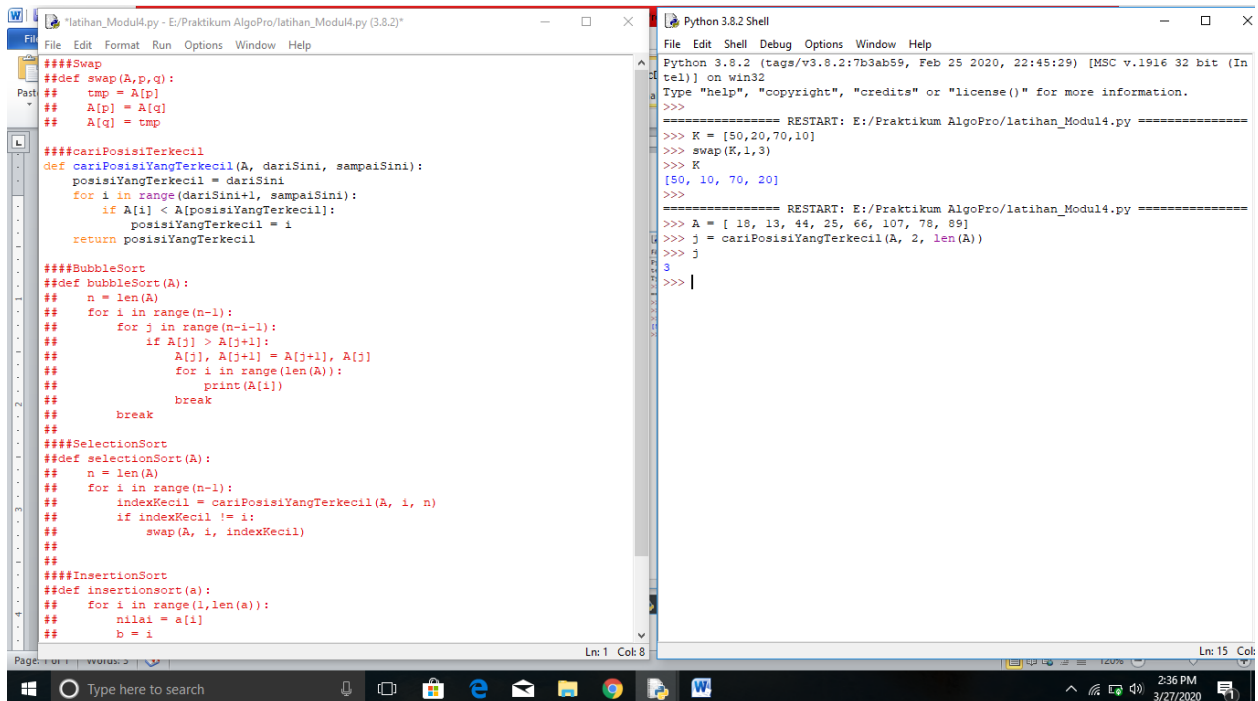
## Latihan Modul 5



The screenshot shows a Python IDE with a file named `latihan_Modul4.py` and a Python 3.8.2 Shell window. The code in the IDE defines several sorting functions: `swap`, `cariPosisiYangTerkecil`, `bubbleSort`, `selectionSort`, and `insertionSort`. The shell window shows the execution of the `swap` function on a list `K`.

```
def swap(A,p,q):  
    tmp = A[p]  
    A[p] = A[q]  
    A[q] = tmp  
  
###cariPosisiYangTerkecil  
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):  
    # posisiYangTerkecil = dariSini  
    for i in range(dariSini+1, sampaiSini):  
        if A[i] < A[posisiYangTerkecil]:  
            posisiYangTerkecil = i  
    return posisiYangTerkecil  
  
###BubbleSort  
def bubbleSort(A):  
    n = len(A)  
    for i in range(n-1):  
        for j in range(n-i-1):  
            if A[j] > A[j+1]:  
                A[j], A[j+1] = A[j+1], A[j]  
            for i in range(len(A)):  
                print(A[i])  
            break  
  
###SelectionSort  
def selectionSort(A):  
    n = len(A)  
    for i in range(n-1):  
        indexKecil = cariPosisiYangTerkecil(A, i, n)  
        if indexKecil != i:  
            swap(A, i, indexKecil)  
  
###InsertionSort  
def insertionSort(a):  
    for i in range(1, len(a)):  
        nilai = a[i]  
        b = i
```

```
Python 3.8.2 Shell  
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (Intel)] on win32  
Type "help", "copyright", "credits" or "license()" for more information.  
>>>  
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====  
>>> K = [50,20,70,10]  
>>> swap(K,1,3)  
>>> K  
[50, 10, 70, 20]  
>>>
```



The screenshot shows the same Python IDE with the same code as the first screenshot. The shell window shows the execution of the `selectionSort` function on a list `A`.

```
def swap(A,p,q):  
    tmp = A[p]  
    A[p] = A[q]  
    A[q] = tmp  
  
###cariPosisiYangTerkecil  
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):  
    # posisiYangTerkecil = dariSini  
    for i in range(dariSini+1, sampaiSini):  
        if A[i] < A[posisiYangTerkecil]:  
            posisiYangTerkecil = i  
    return posisiYangTerkecil  
  
###BubbleSort  
def bubbleSort(A):  
    n = len(A)  
    for i in range(n-1):  
        for j in range(n-i-1):  
            if A[j] > A[j+1]:  
                A[j], A[j+1] = A[j+1], A[j]  
            for i in range(len(A)):  
                print(A[i])  
            break  
  
###SelectionSort  
def selectionSort(A):  
    n = len(A)  
    for i in range(n-1):  
        indexKecil = cariPosisiYangTerkecil(A, i, n)  
        if indexKecil != i:  
            swap(A, i, indexKecil)  
  
###InsertionSort  
def insertionSort(a):  
    for i in range(1, len(a)):  
        nilai = a[i]  
        b = i
```

```
Python 3.8.2 Shell  
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (Intel)] on win32  
Type "help", "copyright", "credits" or "license()" for more information.  
>>>  
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====  
>>> K = [50,20,70,10]  
>>> swap(K,1,3)  
>>> K  
[50, 10, 70, 20]  
>>>  
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====  
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]  
>>> j = cariPosisiYangTerkecil(A, 2, len(A))  
>>> j  
3  
>>>
```

The image shows a Windows desktop with two open Python IDE windows. The left window, titled "latihan\_Modul4.py - E:/Praktikum AlgoPro/latihan\_Modul4.py (3.8.2)", contains the following Python code:

```
####Swap
def swap(A,p,q):
    tmp = A[p]
    A[p] = A[q]
    A[q] = tmp

####cariPosisiTerkecil
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):
    posisiYangTerkecil = dariSini
    for i in range(dariSini+1, sampaiSini):
        if A[i] < A[posisiYangTerkecil]:
            posisiYangTerkecil = i
    return posisiYangTerkecil

####BubbleSort
def bubbleSort(A):
    n = len(A)
    for i in range(n-1):
        for j in range(n-i-1):
            if A[j] > A[j+1]:
                A[j], A[j+1] = A[j+1], A[j]
                for i in range(len(A)):
                    print(A[i])
                break
        break

####SelectionSort
def selectionSort(A):
    n = len(A)
    for i in range(n-1):
        indexKecil = cariPosisiYangTerkecil(A, i, n)
        if indexKecil != i:
            swap(A, i, indexKecil)

####InsertionSort
def insertionsort(a):
    for i in range(1, len(a)):
        nilai = a[i]
        b = i
```

The right window, titled "Python 3.8.2 Shell", shows the execution of the bubbleSort(L) function on a list L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]. The output shows the list being sorted in ascending order:

```
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> bubbleSort(L)
10
2
51
18
4
31
13
5
23
64
29
>>> bubbleSort(L)
2
10
51
18
4
31
13
5
23
64
29
>>> bubbleSort(L)
2
10
18
51
4
31
13
5
23
64
29
>>> bubbleSort(L)
2
```

The taskbar at the bottom shows the Windows Start button, a search bar, and several pinned applications including File Explorer, Edge, and the Python IDE. The system clock in the bottom right corner shows the time as 3:04 PM on 3/27/2020.

The image shows a Windows desktop with two open applications. The left application is a text editor titled "latihan\_Modul4.py - E:\Praktikum AlgoPro\latihan\_Modul4.py (3.8.2)". It contains Python code for several sorting algorithms: swap, cariPosisiYangTerkecil, bubbleSort, and selectionSort. The right application is a Python 3.8.2 Shell window. It shows the execution of the bubbleSort function on a list L. The list L is [64, 29, 2, 4, 5, 10, 13, 18, 23, 31, 51, 29, 64]. The output shows the list being sorted in ascending order: [2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64, 64].

```
##### Swap
def swap(A,p,q):
    tmp = A[p]
    A[p] = A[q]
    A[q] = tmp

##### cariPosisiYangTerkecil
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):
    posisiYangTerkecil = dariSini
    for i in range(dariSini+1, sampaiSini):
        if A[i] < A[posisiYangTerkecil]:
            posisiYangTerkecil = i
    return posisiYangTerkecil

##### BubbleSort
def bubbleSort(A):
    n = len(A)
    for i in range(n-1):
        for j in range(n-i-1):
            if A[j] > A[j+1]:
                A[j], A[j+1] = A[j+1], A[j]
            for i in range(len(A)):
                print(A[i])
            break

##### SelectionSort
def selectionSort(A):
    n = len(A)
    for i in range(n-1):
        indexKecil = cariPosisiYangTerkecil(A, i, n)
        if indexKecil != i:
            swap(A, i, indexKecil)

##### InsertionSort
def insertionSort(a):
    for i in range(1, len(a)):
        nilai = a[i]
        b = i
```

Python 3.8.2 Shell

```
File Edit Shell Debug Options Window Help
51
64
29
>>> bubbleSort(L)
2
4
5
10
13
18
23
31
51
29
64
>>> bubbleSort(L)
2
4
5
10
13
18
23
31
51
29
64
>>> bubbleSort(L)
2
4
5
10
13
18
23
29
31
51
64
64
>>>
```

Ln: 12 Col: 0

Ln: 294 Col: 0

Page | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 |

```
latihan_Modul4.py - E:/Praktikum AlgoPro/latihan_Modul4.py (3.8.2)
File Edit Format Run Options Window Help

####Swap
def swap(A,p,q):
    tmp = A[p]
    A[p] = A[q]
    A[q] = tmp

####cariPosisiTerkecil
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):
    posisiYangTerkecil = dariSini
    for i in range(dariSini+1, sampaiSini):
        if A[i] < A[posisiYangTerkecil]:
            posisiYangTerkecil = i
    return posisiYangTerkecil

####BubbleSort
def bubbleSort(A):
    n = len(A)
    for i in range(n-1):
        for j in range(n-1-i):
            if A[j] > A[j+1]:
                A[j], A[j+1] = A[j+1], A[j]
                for i in range(len(A)):
                    print(A[i])
                break
        break

####SelectionSort
def selectionSort(A):
    n = len(A)
    for i in range(n-1):
        indexKecil = cariPosisiYangTerkecil(A, i, n)
        if indexKecil != i:
            swap(A, i, indexKecil)

####InsertionSort
def insertionsort(a):
    for i in range(1,len(a)):
        nilai = a[i]
        b = i

Python 3.8.2 Shell
File Edit Shell Debug Options Window Help

4
5
10
13
18
23
29
31
51
64
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> K = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> selectionSort(K)
>>> selectionSort(A)
Traceback (most recent call last):
  File "<pyshell#34>", line 1, in <module>
    selectionSort(A)
NameError: name 'A' is not defined
>>> A = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> selectionSort(A)
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> K = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> indexKecil
Traceback (most recent call last):
  File "<pyshell#38>", line 1, in <module>
    indexKecil
NameError: name 'indexKecil' is not defined
>>> selectionSort(K)
>>> indexKecil
Traceback (most recent call last):
  File "<pyshell#40>", line 1, in <module>
    indexKecil
NameError: name 'indexKecil' is not defined
>>> selectionSort(K)
>>> K
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

```
latihan_Modul4.py - E:/Praktikum AlgoPro/latihan_Modul4.py (3.8.2)
File Edit Format Run Options Window Help

####cariPosisiYangTerkecil
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):
    posisiYangTerkecil = dariSini
    for i in range(dariSini+1, sampaiSini):
        if A[i] < A[posisiYangTerkecil]:
            posisiYangTerkecil = i
    return posisiYangTerkecil

####BubbleSort
def bubbleSort(A):
    n = len(A)
    for i in range(n-1):
        for j in range(n-1-i):
            if A[j] > A[j+1]:
                A[j], A[j+1] = A[j+1], A[j]
                for i in range(len(A)):
                    print(A[i])
                break
        break

####SelectionSort
def selectionSort(A):
    n = len(A)
    for i in range(n-1):
        indexKecil = cariPosisiYangTerkecil(A, i, n)
        if indexKecil != i:
            swap(A, i, indexKecil)

####InsertionSort
def insertionsort(a):
    for i in range(1,len(a)):
        nilai = a[i]
        b = i
        while b > 0 and nilai < a[b-1]:
            a[b] = a[b-1]
            b -= 1
        a[b] = nilai
    print(a)

Python 3.8.2 Shell
File Edit Shell Debug Options Window Help

>>> selectionSort(A)
Traceback (most recent call last):
  File "<pyshell#34>", line 1, in <module>
    selectionSort(A)
NameError: name 'A' is not defined
>>> A = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> selectionSort(A)
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> K = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> indexKecil
Traceback (most recent call last):
  File "<pyshell#38>", line 1, in <module>
    indexKecil
NameError: name 'indexKecil' is not defined
>>> selectionSort(K)
>>> indexKecil
Traceback (most recent call last):
  File "<pyshell#40>", line 1, in <module>
    indexKecil
NameError: name 'indexKecil' is not defined
>>> selectionSort(K)
>>> K
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> p
Traceback (most recent call last):
  File "<pyshell#43>", line 1, in <module>
    p
NameError: name 'p' is not defined
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>> a = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> insertionsort(a)
>>> a
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
===== RESTART: E:/Praktikum AlgoPro/latihan_Modul4.py =====
>>>
```