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import time
import math
import os
import random

class sort():

   def disp(list):
      print()
      print(list)
      print()

   def getSize():
      import random
      size=random.randint(10,100)

      return(size)

   def init(list, size):
      i=0
      list=[0 for i in range(size)]
      return(list)

   def make(list):
      size=len(list)
      i=0
      for i in range(size):
         list[i]=i
         i+=1
      return(list)

   def shuffle(list):
      import random
      random.shuffle(list)
      return(list)

   def insertion(list):
      for i in range(1,len(list)):

         tesla=list[i]
         k=i

         while k>0 and list[k-1]>tesla:
            list[k]=list[k-1]
            k=k-1

         list[k]=tesla

      return(list)

   def selection(list):
      for j in range(len(list)-1,0,-1):
         max=0
         for k in range(1,j+1):
            if list[k] > list[max]:
               max=k

         temp=list[j]
         list[j]=list[max]
         list[max]=temp

      return(list)

   def bubble(list):
      for k in range(len(list)-1,0,-1):
         for i in range(k):
            if list[i]>list[i+1]:
               temp=list[i]
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                list[i]=list[i+1]
                list[i+1]=temp
      return(list)

   def cSort(list):
      if len(list)>1:
         mid = len(list)//2
         lft=list[:mid]
         rgt=list[mid:]

         sLft=sort.insertion(lft)
         sRgt=sort.insertion(rgt)

         fin=sLft+sRgt
         done=sort.insertion(fin)
      return(done)

   def chunk(list):
      if len(list)>1:
         mid=len(list)//2
         lft=list[:mid]
         rgt=list[mid:]

         while(mid > 5):
            sort.chunk(lft)
            sort.chunk(rgt)

      return(lft, rgt)



def main():
   widow=sort

   size=widow.getSize()
   print()
   print("SIZE     : ", size)
   print()

   odin=widow.init(list, size)
   zeta=widow.make(odin)
   print("init     : ", zeta)
   print()

   widow.shuffle(zeta)
   print("shuffled : ", zeta)
   print()

   newZeta=widow.insertion(zeta)
   print("insertion: ", newZeta)
   print()

   widow.shuffle(zeta)
   zetaPrime=widow.selection(zeta)
   print("selection: ", zetaPrime)
   print()

   widow.shuffle(zeta)
   omega=widow.bubble(zeta)
   print("bubble   : ", omega)
   print()

   widow.shuffle(zeta)
   chase=widow.cSort(zeta)
   print("cSort    : ", chase)


main()
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