AP2X – P.I.G. – 2020/2

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QUESTÃO 2:

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FROM TKINTER IMPORT *
FROM QUESTAO_1 IMPORT SORTER

DEF CRIAR():
    S = SORTER()
    K = INT(ENTRADA.GET())
    LISTA = SORTER.RANDOMLIST(K)
    LISTA_ORD = S.SORT(LISTA)
    MENSAGEM1["TEXT"] = LISTA
    MENSAGEM2["TEXT"] = LISTA_ORD

WINDOW = TK()
WINDOW.GEOMETRY("500x150+100+100")
WINDOW.TITLE("LISTA")
ENTRADA = ENTRY(WINDOW, FONT="ARIAL 15")
ENTRADA.PACK()

MENSAGEM1 = LABEL(WINDOW, TEXT=" ", FONT="ARIAL 15")
MENSAGEM1.PACK()

MENSAGEM2 = LABEL(WINDOW, TEXT=" ", FONT="ARIAL 15")
MENSAGEM2.PACK()

BOTAO = BUTTON(WINDOW, TEXT="CRIAR LISTA", COMMAND=CRIAR)
BOTAO.PACK()

WINDOW.MAINLOOP()
```

QUESTÃO 1 :

```
IMPORT SYS
IMPORT RANDOM

CLASS SORTER:
    @STATICMETHOD
    DEF RANDOMLIST(K):
        LISTA=[ ]
        IF (K<=0):
            LISTA=[9,3,4,10,100,-5,2,1,4,0,-12]
            RETURN LISTA
        ELSE:
            i=0
            WHILE (i<K):
                NUMBER = RANDOM.RANDINT(10,300)
                LISTA.APPEND(NUMBER)
                i+=1
            RETURN LISTA

    DEF __INIT__(SELF, DEBUG=FALSE):
        SELF.DEBUG=DEBUG


    DEF SORT(SELF, X):
        A=[ ]
        FOR i IN RANGE(LEN(X)):
            POS=SELF.BINARYSEARCH(A,LEN(A)-1,X[i])
            A.INSERT(POS,X[i])
        RETURN A

    DEF BINARYSEARCH(SELF, ARR, LARR, X)
        FIRST=0
        LAST=LARR
        MIDPOINT=0
        WHILE FIRST<=LAST:
            MIDPOINT=(FIRST+LAST)//2
            IF ARR[MIDPOINT]==X
                RETURN MIDPOINT
            ELIF X<ARR[MIDPOINT]:
                LAST=MIDPOINT-1
            ELIF X > ARR[MIDPOINT]:
                FIRST = MIDPOINT+1

        IF FIRST > LAST:
            MIDPOINT = FIRST
        ELSE:
            MIDPOINT = LAST
        RETURN MIDPOINT

DEF MAIN():
    S.SORTER()
    LISTA1 = SORTER.RANDOMLIST(0)
    LISTA2 = S.SORT (LISTA1)
    PRINT ("ORIGINAL LIST = %S" % LISTA1)
    PRINT ("SORTED LIST = %S" % LISTA2)

    N = LISTA1[LEN(LISTA1)//2]
    B = S.BINARYSEARCH(LISTA2, LEN(LISTA2), N)
    PRINT ("POS({})-> SORTED LIST [{}] AND FOUND = {}"
              .FORMAT(N, B, LISTA2[B] == N))

    N = 6
    B = S.BINARYSEARCH(LISTA2, LEN(LISTA2), N)
    PRINT ("POS({})-> SORTED LIST [{}] AND FOUND = {}"
              .FORMAT(N, B, B < LEN(LISTA2) AND LISTA2[B] == N))

IF __NAME__ = "__MAIN__":
    SYS.EXIT(MAIN())
```