CS2302 - Data Structures

Spring 2023

Practice Exam 1 - Part 1

1. (2 points) What is the output of the following code fragment?

```
def pa(A):
    A[1::2] = A[1::2,::-1]

A = np.arange(12).reshape(4,3)
print(A)
p(A)
print(A)
```

2. (2 points) What is the output of the following code fragment?

```
def pi(L1,L2):
    L =[]
    for i in range(len(L1)):
        L.append(L1[i])
        L.append(L2[i])
    return L

L = pi([1,2,4],[5,6,7])
print(L)
```

3. (2 points) What is the output of the following code fragment?

```
def ps(s1,s2,s3):
    S = s1.copy()
    for s in [s1,s2,s3]:
        S = S.intersection(s)
    return S

S = ps(set([1,2,3]), set([2,3,4]), set([3,2,8]))
print(S)
```

4. (2 points) What is the output of the following code fragment?

```
def pd(L1,L2):
    D = {}
    for i in range(len(L1)):
        D[L1[i]] = L2[i]
    return D

D = pd([1,2,4,1],[5,6,7,8])
print(D)
```

5. (8 points) For all functions below, let L be a list, A an array, S a set, and D a dictionary. Let n be the length of the list, array, set, or dictionary. Determine the big-O running time with respect to n of each of the following functions:

```
def is_square(A):
    return len(A.shape)==2 and A.shape[0] == A.shape[1]


def argmax_loop(A):
    amx = 0
    for i in range(A.shape[0]):
        if A[i]>A[amx]:
            amx = i
    return amx


def greater_than_x_lc(L,x):
    return [i for i in L if i>x]


def swap_first_and_last(L):
    L[0],L[-1] = L[-1], L[0]


def intersection_SL(S,L):
    U = set()
    for item in S:
        if item in L:
            U.add(item)
    return U


def intersection_LS(S,L):
    U = set()
    for item in L:
        if item in S:
            U.add(item)
    return U


def item_list(D):
    I = []
    for item in D.keys():
        I.append(D[item])
    return I

def item_2302(D):
    return D.get(2302)
```