Practical 8

Name: Rahul Baser

Roll No.: A4-75

Aim: Write a program to design ESD, TXT and RLD for loader.

Code:

```
from pandas import DataFrame

def printer(arr):
     dataframe = DataFrame(arr[1::],columns=arr[0])
     print(dataframe.to_string(index=False))

length = {
     "D" : 8,
     "A" : 4,
     "H" : 2,
     "C" : 1
}

input_file = open("input.txt")
input_content = input_file.read().split('\n')
input_file.close()

instructions = []

for line in input_content:
     l = line.split(" ")
     try:
     while(True):
          l.remove('')
     except:
     pass
     instructions.append(l)

current_rel = 0
```

```
for i in range(len(instructions)):
     # print(instructions[i])
     instructions[i].insert(0,current_rel)
     if instructions[i][2]=="DC":
     args = instructions[i][-1].split(',')
     for arg in args:
          # print(arg)
          current_rel+=length[arg[0]]

print("Relative Locations")
output = instructions.copy()
output.insert(0,['Rel Ad','Label','Instruction','Arguments'])
printer(output)

esd_card = []

def getRelativeLoc(name):
     for instruction in instructions:
     if(instruction[1]==name):
          return instruction[0]

rel_add = {}

for instruction in instructions:
     if instruction[2]=="START":
     esd_card.append([instruction[1],"SD",1,0,current_rel])
     rel_add[instruction[1]] = 0

     elif instruction[2]=="ENTRY":
     args = instruction[-1].split(',')
     for arg in args:

esd_card.append([arg,"LD","-",getRelativeLoc(arg),'-'])
          rel_add[arg] = getRelativeLoc(arg)
     elif instruction[2]=="EXTRN":
     args = instruction[-1].split(',')
     temp =2
     for arg in args:
          esd_card.append([arg,"ER",temp,'-','-'])
          temp+=1
          rel_add[arg] = 0
```

```
# print(rel_add)

print("\nESD CARD")
output = esd_card.copy()
output.insert(0,['Name','Type','ID','Rel Ad','Length'])
printer(output)

txt_card = []

for instruction in instructions:
     if instruction[2]=="DC":
     temp = instruction[0]
     args = instruction[-1].split(',')
     for arg in args:
          # print(arg)
          content = arg[2:-1]
          for a in rel_add:
               content = content.replace(a,str(rel_add[a]))
          content = eval(content)
          txt_card.append([temp,content])
          temp+=length[arg[0]]

print("\nTXT CARD")
output = txt_card.copy()
output.insert(0,['Rel Ad','Content'])
printer(output)


rld_card = []

def getESDId(name):
     for line in esd_card:
     if(line[0]==name):
          if(line[2]=='-'):
               return 1
          else:
               return line[2]


def isENTRY(name):
```

```
     for line in esd_card:
     if(line[0]==name):
          if(line[1]=="ER"):
               return False
          else:
               return True

for instruction in instructions:
     if instruction[2]=="DC":
     temp = instruction[0]
     args = instruction[-1].split(',')
     for arg in args:
          flaggg = False
          content = arg[2:-1]
          for a in rel_add:
               content = content.replace(a,str(rel_add[a]))
          content = eval(content)
          new_content = arg[2:-1]
          for a in rel_add:
               temp3 = rel_add[a]
               if isENTRY(a):
                    temp3+=9999
               elif (not isENTRY(a)) and new_content.count(a)>0:
                    flaggg = True
               new_content = new_content.replace(a,str(temp3))
          new_content = eval(new_content)
          if(content!=new_content or flaggg):
               flag = '+'
               variable = ''
               content = arg[2:-1]
               for character in content:
                    if character!='+' and character!='-':
                         variable+=character
                    else:
                         try:
                         temp2 = int(variable)
                         except:

rld_card.append([getESDId(variable),length[arg[0]],flag,temp])
                         variable = ''
                         flag = character
```

```
                try:
                     temp2 = int(variable)
                except:

rld_card.append([getESDId(variable),length[arg[0]],flag,temp])
                variable = ''
                flag = character

          temp+=length[arg[0]]

print("\nRLD CARD")
output = rld_card.copy()
output.insert(0,['ESD ID','Length','Flag','Rel Ad'])
printer(output)
```

input.txt

```
PGC0  START  -
-     ENTRY  PGC1,PGC2
-     DC   A(PGC2-PGC0)
PGC1  DC  A(PGC1-4),A(PGC1+8)
PGC2  DC  A(PGC0+PGC2-PGC1)
-     END  -
```

Output:

```
Relative Locations
 Rel Ad Label Instruction          Arguments
      0  PGC0       START                  -
      0     -       ENTRY          PGC1,PGC2
      0     -          DC        A(PGC2-PGC0)
      4  PGC1          DC A(PGC1-4),A(PGC1+8)
     12  PGC2          DC   A(PGC0+PGC2-PGC1)
     16     -         END                    -

ESD CARD
Name Type ID  Rel Ad Length
PGC0   SD  1       0     16
PGC1   LD  -       4      -
PGC2   LD  -      12      -

TXT CARD
 Rel Ad  Content
      0       12
      4        0
      8       12
     12        8

RLD CARD
 ESD ID  Length Flag  Rel Ad
      1       4    +       4
      1       4    +       8
      1       4    +      12
      1       4    +      12
      1       4    -      12
```