Create a Jupyter notebook where you create a list, iterate over the list and sort your results, generate random numbers, add to the list, and then print your result

In [1]:
```
# create a list
my_list = [5, 2, 7, 9, 1, 4, 6, 8, 3]
print("The list is:", my_list)
```

```
The list is: [5, 2, 7, 9, 1, 4, 6, 8, 3]
```

In [2]:
```
# iterate over the list and sort your results
for num in my_list:
    print(num)
print("The sorted list is:", my_list)
```

```
5
2
7
9
1
4
6
8
3
The sorted list is: [5, 2, 7, 9, 1, 4, 6, 8, 3]
```

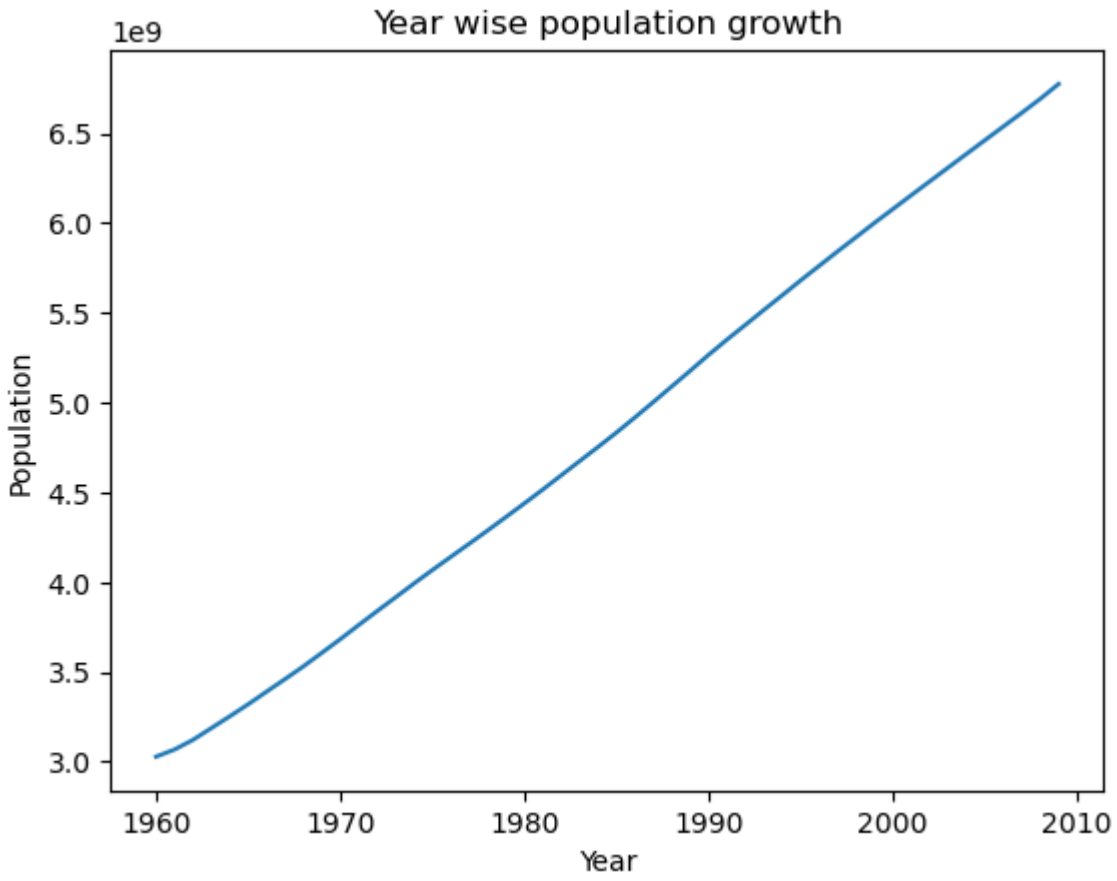
In [3]:
```
# Generate random numbers, add to the list, and then print your results.
import random
for i in range(10):
    my_list.append(random.randint(1, 100))
print("The original list is:", my_list)
```

```
The original list is: [5, 2, 7, 9, 1, 4, 6, 8, 3, 96, 90, 26, 13, 65, 14, 58, 5, 55,
62]
```

In [4]:
```
# Create a line chart with Matplotlib and the following data file

import matplotlib.pyplot as plt #import matplotlib
import pandas as pd #import pandas
file = pd.read_excel("C:\\Users\\14024\\OneDrive\\Desktop\\MS-DSC\\DSC-540\\Week-2\\wo
plt.xlabel('Year') # label X axis
plt.ylabel('Population') # label Y axis
plt.title('Year wise population growth') # Add title
plt.plot(file.Year, file.Population) # line plot
```

Out[4]:
```
[<matplotlib.lines.Line2D at 0x1f0d34158e0>]
```



In [5]:
```
# Create a list of 100 random numbers
# Create a new list from this random list, with numbers that are divisible by 3.
# Calculate the length of these tow lists and store the difference in new variable.
# Using a loop, perform steps 2 and 3 and find the difference variable 3 times.
# Find the arithmetic mean of these three different values.

import random
LMT = 100
randomlist = [random.randint(0, LMT) for x in range(0, LMT)]
randomlist
```

Out[5]:
```
[3,
 82,
 3,
 25,
 86,
 52,
 100,
 94,
 6,
 38,
 10,
 79,
 7,
 12,
 32,
 50,
 55,
 96,
 25,
 19,
 50,
 89,
 44,
 49,
 10,
 43,
 66,
 81,
 84,
 29,
 13,
 73,
 54,
 11,
 90,
 92,
 65,
 33,
 59,
 37,
 77,
 70,
 5,
 3,
 34,
 91,
 15,
 10,
 39,
 81,
 55,
 0,
 89,
 3,
 69,
 1,
 38,
 29,
 82,
 37,
```

```
53,
48,
60,
24,
17,
5,
32,
6,
27,
86,
10,
94,
64,
9,
32,
9,
97,
53,
43,
6,
71,
37,
60,
55,
37,
17,
71,
35,
28,
76,
27,
84,
25,
56,
33,
58,
18,
51,
76,
63]
```

In [6]:
```
# Create a new list from this random list, with numbers that are divisible by 3.
randomlist1 = []
for n in randomlist:
    if n % 3 == 0:
        randomlist1.append(n)
print(randomlist1)
```

```
[3, 3, 6, 12, 96, 66, 81, 84, 54, 90, 33, 3, 15, 39, 81, 0, 3, 69, 48, 60, 24, 6, 27,
9, 9, 6, 60, 27, 84, 33, 18, 51, 63]
```

In [7]:
```
#calculae length of randomlist
len(randomlist)
#calculae length of randomlist1
len(randomlist1)
# Calculate the difference in length and store in a variable
diff_len = len(randomlist) - len(randomlist1)
diff_len
```

Out[7]:
```
67
```

In [8]:
```
ITERATION_NO = 3
difference_list = []
for i in range(0, ITERATION_NO):
    randomlist = [random.randint(0, LMT) for x in range(0, LMT)]
    list_divisible_by_3 = [a for a in randomlist if a % 3 == 0]

    length_of_random_list = len(randomlist)
    length_of_3_divisible_list = len(list_divisible_by_3)
    difference = length_of_random_list - length_of_3_divisible_list

    difference_list.append(difference)
difference_list
```

Out[8]:
```
[68, 56, 70]
```

In [9]:
```
avg_diff = sum(difference_list) / float(len(difference_list))
avg_diff
```

Out[9]:
```
64.66666666666667
```

In [10]:
```
# Get a multiline text and save it in a python variable
# Get rid of all new lines in it using string methods
# Get all the unique words and their occurances from the string
# Repeat the step to find all unique words and occurances, without considering case se
```

In [11]:
```
mutiline_text = """It is a truth universally acknowledged, that a single man in posses

However little known the feelings or views of such a man may be on his first entering

"My dear Mr. Bennet," said his lady to him one day, "have you heard that Netherfield P

Mr. Bennet replied that he had not.

"But it is," returned she; "for Mrs. Long has just been here, and she told me all abou

Mr. Bennet made no answer.

"Do you not want to know who has taken it?" cried his wife impatiently.

"You want to tell me, and I have no objection to hearing it."

This was invitation enough.

"Why, my dear, you must know, Mrs. Long says that Netherfield is taken by a young man

"What is his name?"

"Bingley."

"Is he married or single?"

"Oh! Single, my dear, to be sure! A single man of large fortune; four or five thousand

"How so? How can it affect them?"

"My dear Mr. Bennet," replied his wife, "how can you be so tiresome! You must know tha
```

```
"Is that his design in settling here?"

"Design! Nonsense, how can you talk so! But it is very likely that he may fall in love

"I see no occasion for that. You and the girls may go, or you may send them by themsel

"My dear, you flatter me. I certainly have had my share of beauty, but I do not preter

"In such cases, a woman has not often much beauty to think of."

"But, my dear, you must indeed go and see Mr. Bingley when he comes into the neighbour

"It is more than I engage for, I assure you."

"But consider your daughters. Only think what an establishment it would be for one of

"You are over-scrupulous, surely. I dare say Mr. Bingley will be very glad to see you;

"I desire you will do no such thing. Lizzy is not a bit better than the others; and I

"They have none of them much to recommend them," replied he; "they are all silly and i

"Mr. Bennet, how can you abuse your own children in such a way? You take delight in ve

"You mistake me, my dear. I have a high respect for your nerves. They are my old frier

"Ah, you do not know what I suffer."

"But I hope you will get over it, and live to see many young men of four thousand a ye

"It will be no use to us, if twenty such should come, since you will not visit them."

"Depend upon it, my dear, that when there are twenty, I will visit them all."

Mr. Bennet was so odd a mixture of quick parts, sarcastic humour, reserve, and caprice

type(mutiline_text)
```

Out[11]:
```
str
```

In [12]:
```
len(mutiline_text)
mutiline_text = mutiline_text.replace('\n', "")
# remove special chars
clean_multiline_text = ""
for char in mutiline_text:
    if char == " ":
        clean_multiline_text += char
    elif char.isalnum():
        clean_multiline_text += char
    else:
        clean_multiline_text += " "
clean_multiline_text
```

Out[12]:
```
'It is a truth universally acknowledged  that a single man in possession of a good fo
rtune  must be in want of a wife However little known the feelings or views of such a
man may be on his first entering a neighbourhood  this truth is so well fixed in the
minds of the surrounding families  that he is considered the rightful property of som
e one or other of their daughters  My dear Mr  Bennet  said his lady to him one day
have you heard that Netherfield Park is let at last  Mr  Bennet replied that he had n
ot  But it is  returned she  for Mrs  Long has just been here  and she told me all
about it  Mr  Bennet made no answer  Do you not want to know who has taken it  cried
his wife impatiently  You want to tell me  and I have no objection to hearing it  Thi
s was invitation enough  Why  my dear  you must know  Mrs  Long says that Netherfield
is taken by a young man of large fortune from the north of England  that he came down
on Monday in a chaise and four to see the place  and was so much delighted with it  t
hat he agreed with Mr  Morris immediately  that he is to take possession before Micha
elmas  and some of his servants are to be in the house by the end of next week  What
is his name  Bingley  Is he married or single  Oh  Single  my dear  to be sure  A
single man of large fortune  four or five thousand a year  What a fine thing for our
girls  How so  How can it affect them  My dear Mr  Bennet  replied his wife  how
can you be so tiresome  You must know that I am thinking of his marrying one of them
Is that his design in settling here  Design  Nonsense  how can you talk so  But it i
s very likely that he may fall in love with one of them  and therefore you must visit
him as soon as he comes  I see no occasion for that  You and the girls may go  or yo
u may send them by themselves  which perhaps will be still better  for as you are as
handsome as any of them  Mr  Bingley may like you the best of the party  My dear  yo
u flatter me  I certainly have had my share of beauty  but I do not pretend to be any
thing extraordinary now  When a woman has five grown up daughters  she ought to give
over thinking of her own beauty  In such cases  a woman has not often much beauty to
think of  But  my dear  you must indeed go and see Mr  Bingley when he comes into th
e neighbourhood  It is more than I engage for  I assure you  But consider your daug
hters  Only think what an establishment it would be for one of them  Sir William and
Lady Lucas are determined to go  merely on that account  for in general  you know  th
ey visit no newcomers  Indeed you must go  for it will be impossible for us to visit
him if you do not  You are over scrupulous  surely  I dare say Mr  Bingley will be v
ery glad to see you  and I will send a few lines by you to assure him of my hearty co
nsent to his marrying whichever he chooses of the girls  though I must throw in a goo
d word for my little Lizzy  I desire you will do no such thing  Lizzy is not a bit b
etter than the others  and I am sure she is not half so handsome as Jane  nor half so
good humoured as Lydia  But you are always giving her the preference  They have none
of them much to recommend them  replied he  they are all silly and ignorant like ot
her girls  but Lizzy has something more of quickness than her sisters  Mr  Bennet  h
ow can you abuse your own children in such a way  You take delight in vexing me  You
have no compassion for my poor nerves  You mistake me  my dear  I have a high respec
t for your nerves  They are my old friends  I have heard you mention them with consid
eration these last twenty years at least  Ah  you do not know what I suffer  But I
hope you will get over it  and live to see many young men of four thousand a year com
e into the neighbourhood  It will be no use to us  if twenty such should come  since
you will not visit them  Depend upon it  my dear  that when there are twenty  I will
visit them all  Mr  Bennet was so odd a mixture of quick parts  sarcastic humour  res
erve  and caprice  that the experience of three and twenty years had been insufficien
t to make his wife understand his character  Her mind was less difficult to develop
She was a woman of mean understanding  little information  and uncertain temper  When
she was discontented  she fancied herself nervous  The business of her life was to ge
t her daughters married  its solace was visiting and news  '
```

In [13]:
```
list_of_words = clean_multiline_text.split()
list_of_words
# Use set to get unique words
unique_words_as_dict = dict.fromkeys(list_of_words)
len(list(unique_words_as_dict.keys()))
```

Out[13]:
```
340
```

In [14]:
```
for word in list_of_words:
    if unique_words_as_dict[word] is None:
        unique_words_as_dict[word] = 1
    else:
        unique_words_as_dict[word] += 1
unique_words_as_dict
```

Out[14]:

```
{'It': 3,
 'is': 12,
 'a': 20,
 'truth': 2,
 'universally': 1,
 'acknowledged': 1,
 'that': 15,
 'single': 3,
 'man': 4,
 'in': 11,
 'possession': 2,
 'of': 29,
 'good': 3,
 'fortune': 3,
 'must': 7,
 'be': 11,
 'want': 3,
 'wife': 4,
 'However': 1,
 'little': 3,
 'known': 1,
 'the': 17,
 'feelings': 1,
 'or': 5,
 'views': 1,
 'such': 5,
 'may': 5,
 'on': 3,
 'his': 11,
 'first': 1,
 'entering': 1,
 'neighbourhood': 3,
 'this': 1,
 'so': 8,
 'well': 1,
 'fixed': 1,
 'minds': 1,
 'surrounding': 1,
 'families': 1,
 'he': 11,
 'considered': 1,
 'rightful': 1,
 'property': 1,
 'some': 2,
 'one': 5,
 'other': 2,
 'their': 1,
 'daughters': 4,
 'My': 3,
 'dear': 8,
 'Mr': 10,
 'Bennet': 6,
 'said': 1,
 'lady': 1,
 'to': 22,
 'him': 4,
 'day': 1,
 'have': 7,
 'you': 24,
 'heard': 2,
```

```
'Netherfield': 2,
'Park': 1,
'let': 1,
'at': 2,
'last': 2,
'replied': 3,
'had': 3,
'not': 9,
'But': 6,
'it': 11,
'returned': 1,
'she': 6,
'for': 12,
'Mrs': 2,
'Long': 2,
'has': 5,
'just': 1,
'been': 2,
'here': 2,
'and': 17,
'told': 1,
'me': 5,
'all': 3,
'about': 1,
'made': 1,
'no': 7,
'answer': 1,
'Do': 1,
'know': 5,
'who': 1,
'taken': 2,
'cried': 1,
'impatiently': 1,
'You': 7,
'tell': 1,
'I': 17,
'objection': 1,
'hearing': 1,
'This': 1,
'was': 8,
'invitation': 1,
'enough': 1,
'Why': 1,
'my': 10,
'says': 1,
'by': 4,
'young': 2,
'large': 2,
'from': 1,
'north': 1,
'England': 1,
'came': 1,
'down': 1,
'Monday': 1,
'chaise': 1,
'four': 3,
'see': 5,
'place': 1,
'much': 3,
'delighted': 1,
```

```
'with': 4,
'agreed': 1,
'Morris': 1,
'immediately': 1,
'take': 2,
'before': 1,
'Michaelmas': 1,
'servants': 1,
'are': 8,
'house': 1,
'end': 1,
'next': 1,
'week': 1,
'What': 2,
'name': 1,
'Bingley': 4,
'Is': 2,
'married': 2,
'Oh': 1,
'Single': 1,
'sure': 2,
'A': 1,
'five': 2,
'thousand': 2,
'year': 2,
'fine': 1,
'thing': 2,
'our': 1,
'girls': 4,
'How': 2,
'can': 4,
'affect': 1,
'them': 11,
'how': 3,
'tiresome': 1,
'am': 2,
'thinking': 2,
'marrying': 2,
'design': 1,
'settling': 1,
'Design': 1,
'Nonsense': 1,
'talk': 1,
'very': 2,
'likely': 1,
'fall': 1,
'love': 1,
'therefore': 1,
'visit': 5,
'as': 7,
'soon': 1,
'comes': 2,
'occasion': 1,
'go': 4,
'send': 2,
'themselves': 1,
'which': 1,
'perhaps': 1,
'will': 9,
'still': 1,
```

```
'better': 2,
'handsome': 2,
'any': 1,
'like': 2,
'best': 1,
'party': 1,
'flatter': 1,
'certainly': 1,
'share': 1,
'beauty': 3,
'but': 2,
'do': 4,
'pretend': 1,
'anything': 1,
'extraordinary': 1,
'now': 1,
'When': 2,
'woman': 3,
'grown': 1,
'up': 1,
'ought': 1,
'give': 1,
'over': 3,
'her': 5,
'own': 2,
'In': 1,
'cases': 1,
'often': 1,
'think': 2,
'indeed': 1,
'when': 2,
'into': 2,
'more': 2,
'than': 3,
'engage': 1,
'assure': 2,
'consider': 1,
'your': 3,
'Only': 1,
'what': 2,
'an': 1,
'establishment': 1,
'would': 1,
'Sir': 1,
'William': 1,
'Lady': 1,
'Lucas': 1,
'determined': 1,
'merely': 1,
'account': 1,
'general': 1,
'they': 2,
'newcomers': 1,
'Indeed': 1,
'impossible': 1,
'us': 2,
'if': 2,
'scrupulous': 1,
'surely': 1,
'dare': 1,
```

```
'say': 1,
'glad': 1,
'few': 1,
'lines': 1,
'hearty': 1,
'consent': 1,
'whichever': 1,
'chooses': 1,
'though': 1,
'throw': 1,
'word': 1,
'Lizzy': 3,
'desire': 1,
'bit': 1,
'others': 1,
'half': 2,
'Jane': 1,
'nor': 1,
'humoured': 1,
'Lydia': 1,
'always': 1,
'giving': 1,
'preference': 1,
'They': 2,
'none': 1,
'recommend': 1,
'silly': 1,
'ignorant': 1,
'something': 1,
'quickness': 1,
'sisters': 1,
'abuse': 1,
'children': 1,
'way': 1,
'delight': 1,
'vexing': 1,
'compassion': 1,
'poor': 1,
'nerves': 2,
'mistake': 1,
'high': 1,
'respect': 1,
'old': 1,
'friends': 1,
'mention': 1,
'consideration': 1,
'these': 1,
'twenty': 4,
'years': 2,
'least': 1,
'Ah': 1,
'suffer': 1,
'hope': 1,
'get': 2,
'live': 1,
'many': 1,
'men': 1,
'come': 2,
'use': 1,
'should': 1,
```

```
'since': 1,
'Depend': 1,
'upon': 1,
'there': 1,
'odd': 1,
'mixture': 1,
'quick': 1,
'parts': 1,
'sarcastic': 1,
'humour': 1,
'reserve': 1,
'caprice': 1,
'experience': 1,
'three': 1,
'insufficient': 1,
'make': 1,
'understand': 1,
'character': 1,
'Her': 1,
'mind': 1,
'less': 1,
'difficult': 1,
'develop': 1,
'She': 1,
'mean': 1,
'understanding': 1,
'information': 1,
'uncertain': 1,
'temper': 1,
'discontented': 1,
'fancied': 1,
'herself': 1,
'nervous': 1,
'The': 1,
'business': 1,
'life': 1,
'its': 1,
'solace': 1,
'visiting': 1,
'news': 1}
```

In [15]:
```
top_words = sorted(unique_words_as_dict.items(), key=lambda key_val_tuple: key_val_tup
top_words[:25]
```

Out[15]:
```
[('of', 29),
 ('you', 24),
 ('to', 22),
 ('a', 20),
 ('the', 17),
 ('and', 17),
 ('I', 17),
 ('that', 15),
 ('is', 12),
 ('for', 12),
 ('in', 11),
 ('be', 11),
 ('his', 11),
 ('he', 11),
 ('it', 11),
 ('them', 11),
 ('Mr', 10),
 ('my', 10),
 ('not', 9),
 ('will', 9),
 ('so', 8),
 ('dear', 8),
 ('was', 8),
 ('are', 8),
 ('must', 7)]
```

In [16]:
```
import itertools
perms = itertools.permutations((0, 1, 2))
for p in perms:
    print(p)
    print(type(p))
    print(isinstance(p, (tuple,)))
```

```
(0, 1, 2)
<class 'tuple'>
True
(0, 2, 1)
<class 'tuple'>
True
(1, 0, 2)
<class 'tuple'>
True
(1, 2, 0)
<class 'tuple'>
True
(2, 0, 1)
<class 'tuple'>
True
(2, 1, 0)
<class 'tuple'>
True
```

In [24]:
```
# Define a lambda function to drop leading zeros
drop_leading_zeros = lambda x: tuple(dropwhile(lambda y: y == 0, x))

# Apply the lambda function to each tuple
result_tuples = [drop_leading_zeros(t) for t in possible_tuples]

# Check the type of dropwhile's return
dropwhile_return_type = type(next(iter(dropwhile(lambda y: y == 0, possible_tuples[0])
```

```
# Print the resulting tuples and the type of dropwhile's return
print("Resulting Tuples:", result_tuples)
print("Type of dropwhile's Return:", dropwhile_return_type)

# Define a function to convert the list into a whole number
def tuple_to_whole_number(lst):
    return int(''.join(map(str, lst)))

# Test the function with the first result tuple
first_result_as_number = tuple_to_whole_number(result_tuples[0])
print("First Result as Whole Number:", first_result_as_number)

# Validate the return type is a number, not a string
print("Type of Whole Number:", type(first_result_as_number))
```

```
Resulting Tuples: [(1, 2), (2, 1), (1, 0, 2), (1, 2, 0), (2, 0, 1), (2, 1, 0)]
Type of dropwhile's Return: <class 'int'>
First Result as Whole Number: 12
Type of Whole Number: <class 'int'>
```

In [25]:
```
from itertools import zip_longest

def return_dict_from_csv_line(header, line):
    # Zip them
    zipped_line = zip_longest(header, line, fillvalue=None)
    # Use dict comprehension to generate the final dict
    ret_dict = {kv[0]: kv[1] for kv in zipped_line}
    return ret_dict
```

In [27]:
```
with open("C:\\Users\\14024\\OneDrive\\Desktop\\MS-DSC\\DSC-540\\Week-2\\sales_record.
    first_line = fd.readline()
    header = first_line.replace("\n", "").split(",")
    for i, line in enumerate(fd):
        # Here we loop over the first 10 lines in order to not to make the output too
        line = line.replace("\n", "").split(",")
        d = return_dict_from_csv_line(header, line)
        print(d)
        if i > 10:
            break
```

{'Region': 'Central America and the Caribbean', 'Country': 'Antigua and Barbuda ', 'Item Type': 'Baby Food', 'Sales Channel': 'Online', 'Order Priority': 'M', 'Order Date': '12/20/2013', 'Order ID': '957081544', 'Ship Date': '1/11/2014', 'Units Sold': '552', 'Unit Price': '255.28', 'Unit Cost': '159.42', 'Total Revenue': '140914.56', 'Total Cost': '87999.84', 'Total Profit': '52914.72'}
{'Region': 'Central America and the Caribbean', 'Country': 'Panama', 'Item Type': 'Snacks', 'Sales Channel': 'Offline', 'Order Priority': 'C', 'Order Date': '7/5/2010', 'Order ID': '301644504', 'Ship Date': '7/26/2010', 'Units Sold': '2167', 'Unit Price': '152.58', 'Unit Cost': '97.44', 'Total Revenue': '330640.86', 'Total Cost': '211152.48', 'Total Profit': '119488.38'}
{'Region': 'Europe', 'Country': 'Czech Republic', 'Item Type': 'Beverages', 'Sales Channel': 'Offline', 'Order Priority': 'C', 'Order Date': '9/12/2011', 'Order ID': '478051030', 'Ship Date': '9/29/2011', 'Units Sold': '4778', 'Unit Price': '47.45', 'Unit Cost': '31.79', 'Total Revenue': '226716.10', 'Total Cost': '151892.62', 'Total Profit': '74823.48'}
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{'Region': 'Europe', 'Country': 'Bosnia and Herzegovina', 'Item Type': 'Clothes', 'Sales Channel': 'Online', 'Order Priority': 'M', 'Order Date': '10/14/2013', 'Order ID': '919133651', 'Ship Date': '11/4/2013', 'Units Sold': '927', 'Unit Price': '109.28', 'Unit Cost': '35.84', 'Total Revenue': '101302.56', 'Total Cost': '33223.68', 'Total Profit': '68078.88'}
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