In [1]:

```
import pandas as pd
```

Loading Dataset

In [2]:

```
df = pd.read_csv ('2019 Winter Data Science Intern Challenge Data Set - Sheet1.csv')
```

In [3]:

```
df.head()
```

Out[3]:

	order_id	shop_id	user_id	order_amount	total_items	payment_method	created_at
0	1	53	746	224	2	cash	2017-03-13 12:36:56
1	2	92	925	90	1	cash	2017-03-03 17:38:52
2	3	44	861	144	1	cash	2017-03-14 4:23:56
3	4	18	935	156	1	credit_card	2017-03-26 12:43:37
4	5	18	883	156	1	credit_card	2017-03-01 4:35:11

Data Exploration and Cleaning

In [4]:

```
# No Null Values
print(df.isnull().sum())
print(df.isna().sum())
```

```
order_id          0
shop_id           0
user_id           0
order_amount      0
total_items       0
payment_method    0
created_at        0
dtype: int64
order_id          0
shop_id           0
user_id           0
order_amount      0
total_items       0
payment_method    0
created_at        0
dtype: int64
```

In [5]:

```
# Seems to line up with data set description
# No repeat orders
df.nunique()
```

Out[5]:

```
order_id          5000
shop_id            100
user_id            301
order_amount       258
total_items          8
payment_method       3
payment_method         0
created_at          4991
dtype: int64
```

In [6]:

```
df.set_index('order_id', inplace=True)
```

In [7]:

```
df.dtypes
```

Out[7]:

```
shop_id            int64
user_id            int64
order_amount       int64
total_items        int64
payment_method    object
created_at        object
dtype: object
```

In [8]:

```
df['created_at'] = pd.to_datetime(df['created_at'])
df.dtypes
```

Out[8]:

```
shop_id                    int64
user_id                    int64
order_amount               int64
total_items                int64
payment_method            object
created_at        datetime64[ns]
dtype: object
```

In [9]:

```
# AOV (mean of order_amount) same as described
# mean of order_amount and total_items much greater than median (50%) -> Outlier Suspected
df.describe()
```

Out[9]:

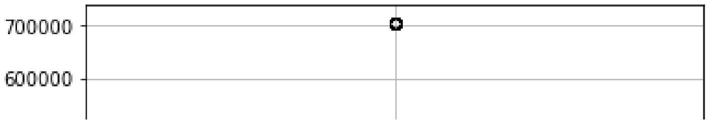
	shop_id	user_id	order_amount	total_items
count	5000.000000	5000.000000	5000.000000	5000.00000
mean	50.078800	849.092400	3145.128000	8.78720
std	29.006118	87.798982	41282.539349	116.32032
min	1.000000	607.000000	90.000000	1.00000
25%	24.000000	775.000000	163.000000	1.00000
50%	50.000000	849.000000	284.000000	2.00000
75%	75.000000	925.000000	390.000000	3.00000
max	100.000000	999.000000	704000.000000	2000.00000

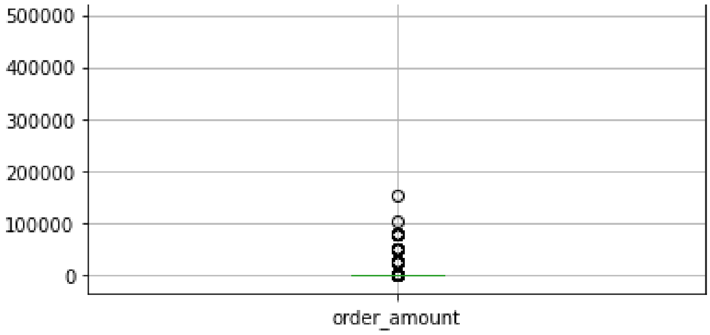
In [10]:

```
df.boxplot(column='order_amount')
```

Out[10]:

```
<AxesSubplot:>
```



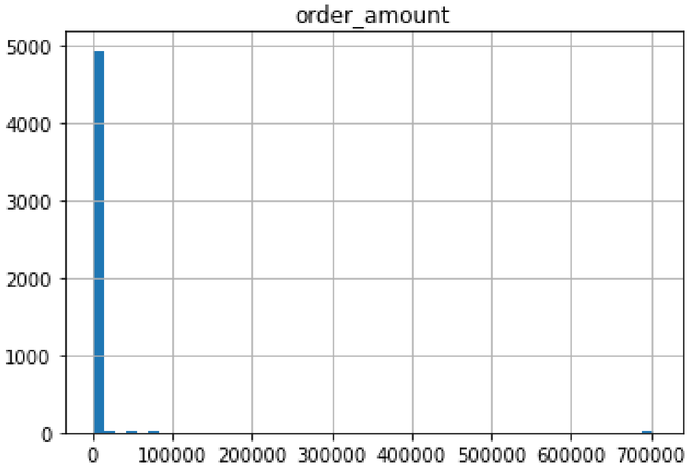


In [11]:

```
df.hist(column='order_amount', bins=50)
```

Out[11]:

```
array([[<AxesSubplot:title={'center':'order_amount'}>]], dtype=object)
```

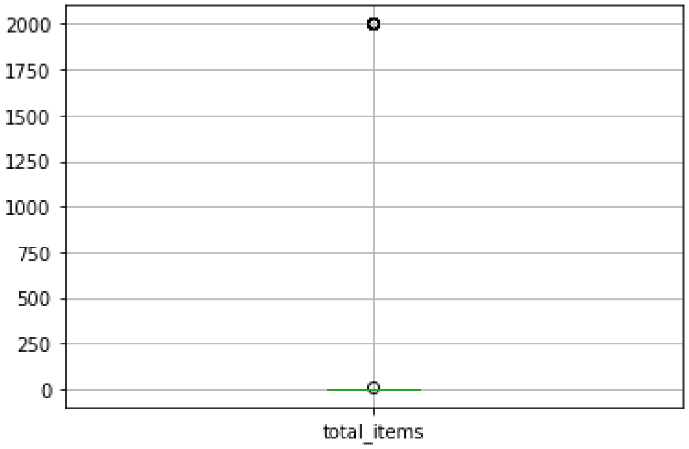


In [12]:

```
df.boxplot(column='total_items')
```

Out[12]:

```
<AxesSubplot:>
```

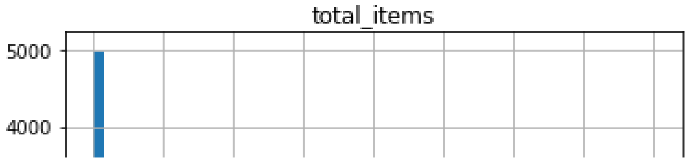


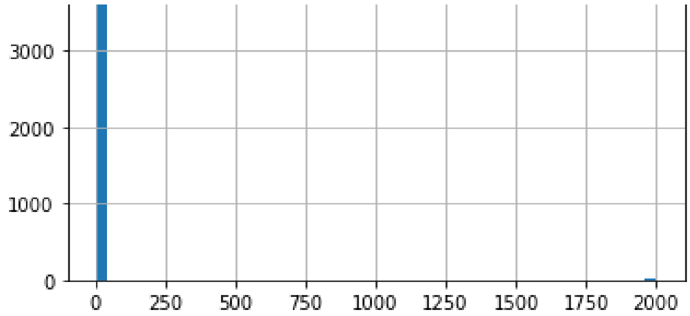
In [13]:

```
df.hist(column='total_items', bins = 50)
```

Out[13]:

```
array([[<AxesSubplot:title={'center':'total_items'}>]], dtype=object)
```





Conclusion

a) Outlier present significantly affected the AOV metric. A better way for evaluating this data using the same metric could be to remove datapoints below and above the 1st and 3rd quartiles in terms of order amount, essentially removing the outliers within the data. However, this needs to be done carefully depending on the dataset and its distribution.

b) A better metric to be used instead will be the Median Order Value as it is not affected by outliers.

c) The value of Median Order Value for the dataset will be $284.00

In [ ]: