online-retail-transactions-eda

May 19, 2023

1 EDA on Online Retail transactions Dataset

Life cycle of Exploratory Data Analysis

- Understanding the Problem Statement
- Data Collection
- Data Cleaning
- Exploratory data analysis
- Data Pre-Processing

1.1 About the dataset

The "Online Retail Transaction" dataset contains information on transactions made by customers through an online retail platform. The dataset includes data on the products that were purchased, the quantity of each product, the date and time of each transaction, the price of each product, the unique identifier for each customer who made a purchase, and the country where each customer is located. This dataset can be used to analyze customer behavior and preferences, identify popular products, and optimize pricing and marketing strategies. The dataset is well-suited for data analysis and machine learning applications, as it contains a large volume of transactional data that can be used to train predictive models and make data-driven decisions.

1.2 Column Description

- StockCode: A code used to identify the product that was purchased
- Description: A brief description of the product that was purchased
- Quantity: The quantity of the product that was purchased
- InvoiceDate: The date and time that the purchase was made
- UnitPrice: The price of one unit of the product that was purchased
- CustomerID: The unique identifier for the customer who made the purchase
- Country: The country where the customer who made the purchase is located

```python
[186]: import pandas as pd
       import numpy as np
       import seaborn as sns
       import matplotlib.pyplot as plt

       %matplotlib inline
       ## Display all the columns of the dataframe
       pd.pandas.set_option("display.max_columns", None)
```

```
[187]: df= pd.read_csv("E://Technical//DS_AI_ML//ml_project_bootcamp//assignment//
       ↪dataset1//Online Retail.csv")
```

```
[188]: df.head()
```

```
[188]:    InvoiceNo StockCode                          Description  Quantity  \
       0     536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
       1     536365     71053                  WHITE METAL LANTERN         6
       2     536365    84406B       CREAM CUPID HEARTS COAT HANGER         8
       3     536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE         6
       4     536365    84029E       RED WOOLLY HOTTIE WHITE HEART.         6

                  InvoiceDate  UnitPrice  CustomerID         Country
       0  2010-12-01 08:26:00       2.55       17850  United Kingdom
       1  2010-12-01 08:26:00       3.39       17850  United Kingdom
       2  2010-12-01 08:26:00       2.75       17850  United Kingdom
       3  2010-12-01 08:26:00       3.39       17850  United Kingdom
       4  2010-12-01 08:26:00       3.39       17850  United Kingdom
```

```
[189]: df.shape
```

```
[189]: (541909, 8)
```

```
[190]: df.info()
```

```
       <class 'pandas.core.frame.DataFrame'>
       RangeIndex: 541909 entries, 0 to 541908
       Data columns (total 8 columns):
        #   Column       Non-Null Count   Dtype
       ---  ------       --------------   -----
        0   InvoiceNo    541909 non-null  object
        1   StockCode    541909 non-null  object
        2   Description  540455 non-null  object
        3   Quantity     541909 non-null  int64
        4   InvoiceDate  541909 non-null  object
        5   UnitPrice    541909 non-null  float64
        6   CustomerID   541909 non-null  int64
        7   Country      541909 non-null  object
       dtypes: float64(1), int64(2), object(5)
       memory usage: 33.1+ MB
```

```
[191]: ## Checking the null values of each column
       df.isnull().sum()
```

```
[191]: InvoiceNo         0
       StockCode         0
       Description    1454
```

```
Quantity          0
InvoiceDate       0
UnitPrice         0
CustomerID        0
Country           0
dtype: int64
```

Description is the only column having null values.

```
[192]: stock= df["StockCode"].value_counts()
       print (stock)
```

```
85123A    2313
22423     2203
85099B    2159
47566     1727
20725     1639
            …
21431        1
22275        1
17001        1
90187A       1
72759        1
Name: StockCode, Length: 4070, dtype: int64
```

```
[193]: ## Counting how many times each country is appearing in the Country column
       df["Country"].value_counts()
```

```
[193]: United Kingdom      495478
       Germany               9495
       France                8557
       EIRE                  8196
       Spain                 2533
       Netherlands           2371
       Belgium               2069
       Switzerland           2002
       Portugal              1519
       Australia             1259
       Norway                1086
       Italy                  803
       Channel Islands        758
       Finland                695
       Cyprus                 622
       Sweden                 462
       Unspecified            446
       Austria                401
       Denmark                389
```

```
Japan                          358
Poland                         341
Israel                         297
USA                            291
Hong Kong                      288
Singapore                      229
Iceland                        182
Canada                         151
Greece                         146
Malta                          127
United Arab Emirates            68
European Community              61
RSA                             58
Lebanon                         45
Lithuania                       35
Brazil                          32
Czech Republic                  30
Bahrain                         19
Saudi Arabia                    10
Name: Country, dtype: int64
```

[194]:
```python
## Satatistical information of the integer data
df.describe()
```

[194]:

	Quantity	UnitPrice	CustomerID
count	541909.000000	541909.000000	541909.000000
mean	9.552250	4.611114	15287.518434
std	218.081158	96.759853	1484.746041
min	-80995.000000	-11062.060000	12346.000000
25%	1.000000	1.250000	14367.000000
50%	3.000000	2.080000	15287.000000
75%	10.000000	4.130000	16255.000000
max	80995.000000	38970.000000	18287.000000

[195]:
```python
df.corr()
```

[195]:

	Quantity	UnitPrice	CustomerID
Quantity	1.000000	-0.001235	-0.003553
UnitPrice	-0.001235	1.000000	-0.002834
CustomerID	-0.003553	-0.002834	1.000000

[196]:
```python
plt.subplots(figsize=(10,10))
sns.heatmap(df.corr(), annot= True)
```

[196]: <AxesSubplot: >
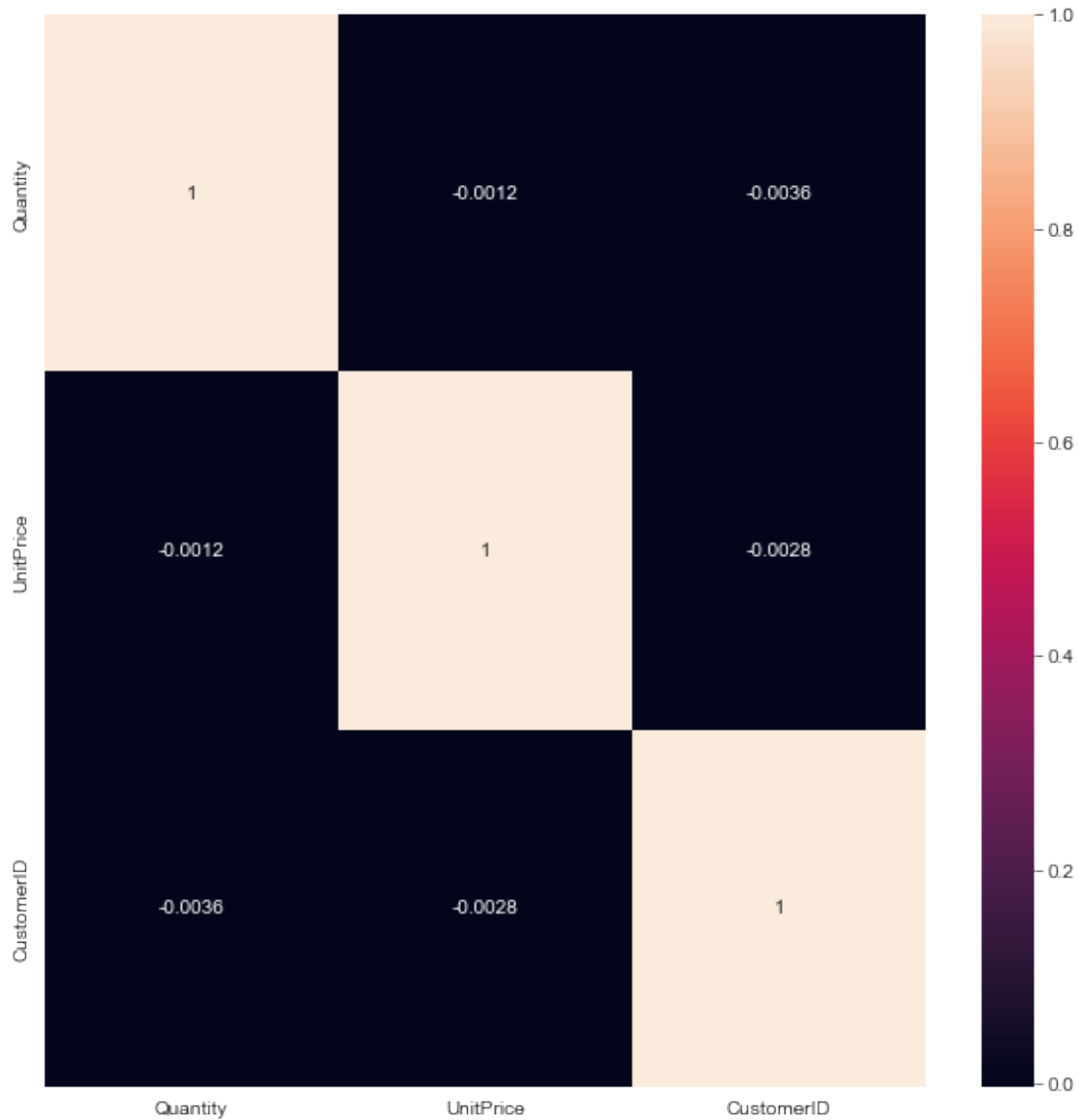
```
[197]: df.head()
```

```
[197]:    InvoiceNo StockCode                          Description  Quantity  \
       0     536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
       1     536365     71053                  WHITE METAL LANTERN         6
       2     536365    84406B        CREAM CUPID HEARTS COAT HANGER         8
       3     536365    84029G   KNITTED UNION FLAG HOT WATER BOTTLE        6
       4     536365    84029E         RED WOOLLY HOTTIE WHITE HEART.       6

                   InvoiceDate  UnitPrice  CustomerID         Country
       0   2010-12-01 08:26:00       2.55       17850  United Kingdom
```

```
1  2010-12-01 08:26:00        3.39        17850   United Kingdom
2  2010-12-01 08:26:00        2.75        17850   United Kingdom
3  2010-12-01 08:26:00        3.39        17850   United Kingdom
4  2010-12-01 08:26:00        3.39        17850   United Kingdom
```

[198]: `df.groupby(["CustomerID"])["Quantity"].value_counts()`

[198]:
```
CustomerID   Quantity
12346        -74215        1
              74215        1
12347         12          56
               4          32
              24          26
                          ..
18287          4           4
              20           2
              30           2
              18           1
              60           1
Name: Quantity, Length: 47627, dtype: int64
```

[199]: `df.duplicated().sum()`

[199]: 5268

[200]:
```
df= df.drop_duplicates()
df.duplicated().sum()
```

[200]: 0

[201]: `df["Description"].value_counts()`

[201]:
```
WHITE HANGING HEART T-LIGHT HOLDER    2357
REGENCY CAKESTAND 3 TIER             2189
JUMBO BAG RED RETROSPOT              2156
PARTY BUNTING                        1720
LUNCH BAG RED RETROSPOT              1625
                                      …
rcvd be air temp fix for dotcom sit     1
SET 12 COLOURING PENCILS DOILEY         1
SET 36 COLOURING PENCILS DOILEY         1
 I LOVE LONDON MINI RUCKSACK            1
found some more on shelf                1
Name: Description, Length: 4223, dtype: int64
```

[202]:
```
idx_list = df[df['Description'].isnull()].index
print(idx_list)
```

6

```
Int64Index([   622,   1970,   1971,   1972,   1987,   1988,   2024,   2025,
              2026,   2406,
            ...
            524473, 524475, 529667, 533711, 533712, 535322, 535326, 535332,
            536981, 538554],
           dtype='int64', length=1454)
```

[203]: `df.head()`

[203]:
```
   InvoiceNo StockCode                          Description  Quantity  \
0     536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
1     536365     71053                  WHITE METAL LANTERN         6
2     536365    84406B       CREAM CUPID HEARTS COAT HANGER         8
3     536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE         6
4     536365    84029E       RED WOOLLY HOTTIE WHITE HEART.         6

          InvoiceDate  UnitPrice  CustomerID         Country
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2 2010-12-01 08:26:00       2.75       17850  United Kingdom
3 2010-12-01 08:26:00       3.39       17850  United Kingdom
4 2010-12-01 08:26:00       3.39       17850  United Kingdom
```

[204]:
```python
# Store the stock code from missing value
list_stockcode_from_missing = []
for item in df[df['Description'].isnull()]['StockCode']:
    list_stockcode_from_missing.append(item)
```

[205]:
```python
# find most suitable description based on stock code
def isNaN(string):
    return string != string
list_description_for_missing = []

for idx,code in enumerate(df['StockCode']):
    for stock in list_stockcode_from_missing:
        if(code == stock):
            if(isNaN(df['Description'].iloc[idx])):
                continue
            list_description_for_missing.append(df['Description'].iloc[idx])
            break
    if(len(list_description_for_missing) == len(list_stockcode_from_missing)):
        break

len(list_description_for_missing)
```

[205]: 1454

```
[206]: list_description_for_missing
```

```
[206]: ['CREAM CUPID HEARTS COAT HANGER',
        'KNITTED UNION FLAG HOT WATER BOTTLE',
        'RED WOOLLY HOTTIE WHITE HEART.',
        'HAND WARMER UNION JACK',
        'HAND WARMER RED POLKA DOT',
        'RECIPE BOX WITH METAL HEART',
        'ALARM CLOCK BAKELIKE GREEN',
        'INFLATABLE POLITICAL GLOBE ',
        'POSTAGE',
        'HAND WARMER RED POLKA DOT',
        'HAND WARMER UNION JACK',
        'CREAM CUPID HEARTS COAT HANGER',
        'RETRO COFFEE MUGS ASSORTED',
        'VINTAGE BILLBOARD DRINK ME MUG',
        'WOOD 2 DRAWER CABINET WHITE FINISH',
        'WOODEN FRAME ANTIQUE WHITE ',
        'KNITTED UNION FLAG HOT WATER BOTTLE',
        'RED WOOLLY HOTTIE WHITE HEART.',
        'VICTORIAN SEWING BOX LARGE',
        'CREAM CUPID HEARTS COAT HANGER',
        'RETRO COFFEE MUGS ASSORTED',
        'VINTAGE BILLBOARD DRINK ME MUG',
        'WOOD 2 DRAWER CABINET WHITE FINISH',
        'WOODEN FRAME ANTIQUE WHITE ',
        'KNITTED UNION FLAG HOT WATER BOTTLE',
        'RED WOOLLY HOTTIE WHITE HEART.',
        'HOT WATER BOTTLE TEA AND SYMPATHY',
        'HAND WARMER RED POLKA DOT',
        'HAND WARMER UNION JACK',
        'JUMBO BAG CHARLIE AND LOLA TOYS',
        'RETROSPOT TEA SET CERAMIC 11 PC ',
        'GIRLY PINK TOOL SET',
        'AIRLINE LOUNGE,METAL SIGN',
        "YOU'RE CONFUSING ME METAL SIGN ",
        'GIN + TONIC DIET METAL SIGN',
        'YELLOW BREAKFAST CUP AND SAUCER',
        'PINK BREAKFAST CUP AND SAUCER ',
        'GUMBALL MONOCHROME COAT RACK',
        'INFLATABLE POLITICAL GLOBE ',
        'ALARM CLOCK BAKELIKE GREEN',
        'IVORY GIANT GARDEN THERMOMETER',
        '3 TIER CAKE TIN RED AND CREAM',
        'SET 3 WICKER OVAL BASKETS W LIDS',
        'SET OF 3 COLOURED  FLYING DUCKS',
        'HANGING MEDINA LANTERN SMALL',
```

'HEART OF WICKER SMALL',
'HEART OF WICKER LARGE',
'SET 3 WICKER OVAL BASKETS W LIDS',
'ORGANISER WOOD ANTIQUE WHITE ',
'WHITE WIRE EGG HOLDER',
'CHILLI LIGHTS',
'HOME SMALL WOOD LETTERS',
'HEART OF WICKER SMALL',
'5 HOOK HANGER MAGIC TOADSTOOL',
'SET OF 3 COLOURED FLYING DUCKS',
'ALARM CLOCK BAKELIKE GREEN',
'BLUE DINER WALL CLOCK',
'ROSE COTTAGE KEEPSAKE BOX ',
'LARGE POPCORN HOLDER ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'CHICK GREY HOT WATER BOTTLE',
'TRADITIONAL WOODEN SKIPPING ROPE',
'RUSTIC SEVENTEEN DRAWER SIDEBOARD',
'PICNIC BASKET WICKER SMALL',
'RETROSPOT LAMP',
'HAND WARMER UNION JACK',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER RED RETROSPOT',
'HAND OVER THE CHOCOLATE   SIGN ',
'CHICK GREY HOT WATER BOTTLE',
'ALARM CLOCK BAKELIKE ORANGE',
'ALARM CLOCK BAKELIKE GREEN',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'HAND WARMER BIRD DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'SET OF 3 COLOURED FLYING DUCKS',
'HAND WARMER RED RETROSPOT',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'SILK PURSE BABUSHKA RED',
'LAVENDER INCENSE IN TIN',

'SILVER LOOKING MIRROR',
'LADIES & GENTLEMEN METAL SIGN',
"YOU'RE CONFUSING ME METAL SIGN ",
"I'M ON HOLIDAY METAL SIGN",
'SET OF 6 T-LIGHTS SNOWMEN',
'SANDWICH BATH SPONGE',
'STAR PORTABLE TABLE LIGHT ',
'PINK OVAL JEWELLED MIRROR',
'COSY HOUR GIANT TUBE MATCHES',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'GUMBALL COAT RACK',
'BLUE NEW BAROQUE CANDLESTICK CANDLE',
'BREAD BIN DINER STYLE PINK',
'JUMBO BAG CHARLIE AND LOLA TOYS',
'TEA TIME TABLE CLOTH',
'PICNIC BASKET WICKER SMALL',
'HOT WATER BOTTLE BABUSHKA ',
'HAND WARMER BIRD DESIGN',
'POSTAGE',
'HEART OF WICKER SMALL',
'BRIGHT BLUES RIBBONS ',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'MAGIC DRAWING SLATE BAKE A CAKE ',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'RED WOOLLY HOTTIE WHITE HEART.',
'SET OF 72 RETROSPOT PAPER DOILIES',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'COSY HOUR GIANT TUBE MATCHES',
'HAND WARMER SCOTTY DOG DESIGN',
'FELTCRAFT CUSHION OWL',
'SET 12 LAVENDER BOTANICAL T-LIGHTS',
'RED HEART LUGGAGE TAG',
'VANILLA SCENT CANDLE JEWELLED BOX',
'CHRISTMAS HANGING HEART WITH BELL',
'BLUE NEW BAROQUE CANDLESTICK CANDLE',
"PINK B'FLY C/COVER W BOBBLES",
'JUMBO BAG OWLS',
'SANDWICH BATH SPONGE',
'OWL DOORSTOP',

```
'HAND WARMER UNION JACK',
'LARGE POPCORN HOLDER ',
'JUMBO BAG STRAWBERRY',
'BLUE POLKADOT PLATE ',
'COSY SLIPPER SHOES SMALL  RED ',
'12 DAISY PEGS IN WOOD BOX',
'HOT WATER BOTTLE BABUSHKA ',
'COSY SLIPPER SHOES SMALL  RED ',
'12 DAISY PEGS IN WOOD BOX',
'5 HOOK HANGER MAGIC TOADSTOOL',
'COSY SLIPPER SHOES SMALL  RED ',
'FELTCRAFT CUSHION OWL',
'FELTCRAFT CUSHION RABBIT',
'ROSE COTTAGE KEEPSAKE BOX ',
'SOLDIERS EGG CUP ',
'TURQUOISE CHRISTMAS TREE ',
'HEART OF WICKER LARGE',
'HEART OF WICKER SMALL',
'FELTCRAFT 6 FLOWER FRIENDS',
'PURPLE DRAWERKNOB ACRYLIC EDWARDIAN',
'HAND WARMER BIRD DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER RED RETROSPOT',
'HOT WATER BOTTLE BABUSHKA ',
'WOODEN FRAME ANTIQUE WHITE ',
'TRADITIONAL WOODEN SKIPPING ROPE',
'HAND WARMER RED RETROSPOT',
'HOT WATER BOTTLE BABUSHKA ',
'RED WOOLLY HOTTIE WHITE HEART.',
'HOT WATER BOTTLE BABUSHKA ',
'CHILLI LIGHTS',
'SILK PURSE BABUSHKA RED',
'SWEETHEART WIRE WALL TIDY',
'CLASSICAL ROSE SMALL VASE',
'RED TEA TOWEL CLASSIC DESIGN',
'GREEN FERN NOTEBOOK',
'BLUE PAISLEY NOTEBOOK',
'TRADITIONAL WOODEN SKIPPING ROPE',
'HANGING GLASS ETCHED TEALIGHT',
'BLUE NEW BAROQUE CANDLESTICK CANDLE',
'KINGS CHOICE GIANT TUBE MATCHES',
'COSY HOUR GIANT TUBE MATCHES',
'S/15 SILVER GLASS BAUBLES IN BAG',
'KINGS CHOICE GIANT TUBE MATCHES',
'IVORY GIANT GARDEN THERMOMETER',
'BLUE GIANT GARDEN THERMOMETER',
'CHICK GREY HOT WATER BOTTLE',
```

```
'VICTORIAN SEWING BOX SMALL ',
'VICTORIAN SEWING BOX MEDIUM',
'BLUE SWEETHEART BRACELET',
'SOLDIERS EGG CUP ',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'HEART T-LIGHT HOLDER ',
'SET OF 6 T-LIGHTS SNOWMEN',
'SET/9 CHRISTMAS T-LIGHTS SCENTED ',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'COSY SLIPPER SHOES SMALL  RED ',
'DOORMAT BLACK FLOCK ',
'CHRISTMAS DECOUPAGE CANDLE',
'HEART T-LIGHT HOLDER ',
'RED WOOLLY HOTTIE WHITE HEART.',
'BLACK RECORD COVER FRAME',
'36 PENCILS TUBE WOODLAND',
'HAND WARMER UNION JACK',
'HAND WARMER RED RETROSPOT',
'VINTAGE UNION JACK BUNTING',
'SET/9 CHRISTMAS T-LIGHTS SCENTED ',
'PAPER BUNTING WHITE LACE',
"POTTING SHED SOW 'N' GROW SET",
'HAND WARMER BIRD DESIGN',
'PINK HEARTS PAPER GARLAND',
'POTTING SHED SEED ENVELOPES',
'FELTCRAFT 6 FLOWER FRIENDS',
'CARD DOLLY GIRL ',
'RAINY LADIES BIRTHDAY CARD',
'RED WOOLLY HOTTIE WHITE HEART.',
'RED WHITE SCARF  HOT WATER BOTTLE',
'LANTERN CREAM GAZEBO ',
'HAND WARMER OWL DESIGN',
'HAND WARMER UNION JACK',
'HAND WARMER SCOTTY DOG DESIGN',
'GIN + TONIC DIET METAL SIGN',
'IVORY GIANT GARDEN THERMOMETER',
'CARD HOLDER GINGHAM HEART',
'HAND WARMER RED RETROSPOT',
'HAND WARMER UNION JACK',
'HEART OF WICKER LARGE',
'PINK HEART DOTS HOT WATER BOTTLE',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'WHITE CHRISTMAS GARLAND STARS TREES',
'HEART OF WICKER SMALL',
'HEART OF WICKER SMALL',
'SMALL LICORICE DES PINK BOWL',
```

'PICNIC BASKET WICKER LARGE',
'CREAM SWEETHEART EGG HOLDER',
'RIDGED GLASS STORAGE JAR CREAM LID',
'HAND WARMER OWL DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER RED RETROSPOT',
'RETRO COFFEE MUGS ASSORTED',
'CHRISTMAS TOILET ROLL',
'PINK HEARTS PAPER GARLAND',
'PINK & WHITE BREAKFAST TRAY',
'RIDGED GLASS STORAGE JAR CREAM LID',
'HAND WARMER RED RETROSPOT',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'FELTCRAFT 6 FLOWER FRIENDS',
'VICTORIAN SEWING BOX SMALL ',
'EIGHT PIECE DINOSAUR SET',
'HEADS AND TAILS SPORTING FUN',
'FELTCRAFT 6 FLOWER FRIENDS',
'12 PENCIL SMALL TUBE WOODLAND',
'BLUE PAPER PARASOL ',
'HANGING MEDINA LANTERN SMALL',
'METAL 4 HOOK HANGER FRENCH CHATEAU',
'RED KITCHEN SCALES',
'5 HOOK HANGER MAGIC TOADSTOOL',
'3 HOOK HANGER MAGIC GARDEN',
'JUMBO BAG OWLS',
'HOT WATER BOTTLE BABUSHKA ',
'PACK 3 FIRE ENGINE/CAR PATCHES',
'POSTAGE',
'HAND WARMER OWL DESIGN',
'COSY HOUR GIANT TUBE MATCHES',
'MEASURING TAPE BABUSHKA RED',
'HAND WARMER OWL DESIGN',
'HAND WARMER BIRD DESIGN',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'MEASURING TAPE BABUSHKA RED',
'MEASURING TAPE BABUSHKA BLUE',
'PENCIL CASE LIFE IS BEAUTIFUL',
'FELTCRAFT CUSHION OWL',
'FELTCRAFT CUSHION RABBIT',
'ROSE COTTAGE KEEPSAKE BOX ',
'WOODEN ADVENT CALENDAR RED',
'STAR PORTABLE TABLE LIGHT ',
'STRING OF STARS CARD HOLDER',
'VICTORIAN SEWING BOX LARGE',
'MINT KITCHEN SCALES',
'VINTAGE BILLBOARD DRINK ME MUG',

'SET/4 MODERN VINTAGE COTTON NAPKINS',
'SET 3 WICKER OVAL BASKETS W LIDS',
'NO JUNK MAIL METAL SIGN',
'VINTAGE GLASS COFFEE CADDY',
'GLASS BEURRE DISH',
'RIDGED GLASS STORAGE JAR CREAM LID',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'ALARM CLOCK BAKELIKE GREEN',
'BLACK DINER WALL CLOCK',
'BLUE DINER WALL CLOCK',
'DOORMAT PEACE ON EARTH BLUE',
'GROW YOUR OWN PLANT IN A CAN ',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER RED RETROSPOT',
'HAND WARMER OWL DESIGN',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'GINGERBREAD MAN COOKIE CUTTER',
'I CAN ONLY PLEASE ONE PERSON MUG',
'LARGE POPCORN HOLDER ',
'RECIPE BOX BLUE SKETCHBOOK DESIGN',
'20 DOLLY PEGS RETROSPOT',
'LADIES & GENTLEMEN METAL SIGN',
'HAND OVER THE CHOCOLATE   SIGN ',
'POLKADOT PEN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER BIRD DESIGN',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'NOEL WOODEN BLOCK LETTERS ',
'SET OF 2 CHRISTMAS DECOUPAGE CANDLE',
'T-LIGHT GLASS FLUTED ANTIQUE',
'SILVER CANDLEPOT JARDIN ',
'PAPER BUNTING COLOURED LACE',
'HEART OF WICKER LARGE',
'HEART OF WICKER SMALL',
'METAL 4 HOOK HANGER FRENCH CHATEAU',
'ANTIQUE GLASS HEART DECORATION ',
'SET OF 6 KASHMIR FOLKART BAUBLES',
'3 HOOK PHOTO SHELF ANTIQUE WHITE',
'METAL 4 HOOK HANGER FRENCH CHATEAU',
'CREAM SWEETHEART WALL CABINET',
'STAR PORTABLE TABLE LIGHT ',
'RED GINGHAM ROSE JEWELLERY BOX',
'HAND WARMER BIRD DESIGN',
'HAND WARMER RED RETROSPOT',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'ROSE COTTAGE KEEPSAKE BOX ',

'BLUE DRAGONFLY HELICOPTER',
'TRADITIONAL WOODEN SKIPPING ROPE',
'CARRIAGE',
'JUMBO BAG STRAWBERRY',
'JUMBO BAG OWLS',
'HAND WARMER RED RETROSPOT',
'CHRISTMAS TREE DECORATION WITH BELL',
'CHRISTMAS TREE STAR DECORATION',
'CHRISTMAS HANGING TREE WITH BELL',
'CHRISTMAS HANGING HEART WITH BELL',
'I CAN ONLY PLEASE ONE PERSON MUG',
'POTTING SHED SEED ENVELOPES',
'GARDEN METAL SIGN ',
'RIBBON REEL POLKADOTS ',
'PAPER BUNTING WHITE LACE',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'FELTCRAFT 6 FLOWER FRIENDS',
'STAR DECORATION RUSTIC',
'HEART GARLAND RUSTIC PADDED',
'LARGE POPCORN HOLDER ',
'WASH BAG VINTAGE ROSE PAISLEY',
'DOVE DECORATION PAINTED ZINC ',
'GROW YOUR OWN PLANT IN A CAN ',
'SILK PURSE BABUSHKA RED',
'HEART OF WICKER SMALL',
'HEART OF WICKER LARGE',
'SET OF 2 TINS VINTAGE BATHROOM ',
'CHILDS GARDEN BRUSH PINK',
'HEADS AND TAILS SPORTING FUN',
'CARD HOLDER GINGHAM HEART',
'RED KITCHEN SCALES',
'HAND WARMER RED RETROSPOT',
'RECIPE BOX BLUE SKETCHBOOK DESIGN',
'GUMBALL MONOCHROME COAT RACK',
'ALARM CLOCK BAKELIKE ORANGE',
'SET OF 6 RIBBONS VINTAGE CHRISTMAS',
'POLKADOT PEN',
'CHALKBOARD KITCHEN ORGANISER',
'T-LIGHT GLASS FLUTED ANTIQUE',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'HOT WATER BOTTLE BABUSHKA ',
'BREAD BIN DINER STYLE IVORY',
'LOVE HEART NAPKIN BOX ',
'HAND WARMER OWL DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER BIRD DESIGN',
'GINGERBREAD MAN COOKIE CUTTER',

'SOLDIERS EGG CUP ',
'SMALLFOLKART BAUBLE CHRISTMAS DEC',
'RETRO COFFEE MUGS ASSORTED',
'CONDIMENT TRAY 4 BOWLS AND 4 SPOONS',
'TEA TIME OVEN GLOVE',
'SCOTTIES CHILDRENS APRON',
'PINK FAIRY CAKE CHILDRENS APRON',
'IVORY PILLAR CANDLE GOLD FLOCK',
'SET/3 CHRISTMAS DECOUPAGE CANDLES',
'SET OF 2 CHRISTMAS DECOUPAGE CANDLE',
'TUMBLER, BAROQUE',
'CHILLI LIGHTS',
'LAUNDRY 15C METAL SIGN',
'HOT BATHS METAL SIGN',
'METAL SIGN,CUPCAKE SINGLE HOOK',
'RED WOOLLY HOTTIE WHITE HEART.',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'SET OF 6 VINTAGE NOTELETS KIT',
'ENVELOPE 50 ROMANTIC IMAGES',
'ENVELOPE 50 BLOSSOM IMAGES',
'YULETIDE IMAGES GIFT WRAP SET',
'CREAM SWEETHEART LETTER RACK',
'SMALL SQUARE CUT GLASS CANDLESTICK',
'BLUE DRAGONFLY HELICOPTER',
'HAND OVER THE CHOCOLATE   SIGN ',
'SET OF 3 BABUSHKA STACKING TINS',
'NECKLACE+BRACELET SET BLUE HIBISCUS',
'BLUE SWEETHEART BRACELET',
'GREEN ENAMEL+GLASS HAIR COMB',
'DOTCOM POSTAGE',
'FAIRY CAKE NOTEBOOK A5 SIZE',
'DOG TOY WITH PINK CROCHET SKIRT',
'GREEN ROSE WASHBAG',
'SOFT PINK ROSE TOWEL ',
'BLUE PATCH PURSE PINK HEART',
'HAND WARMER UNION JACK',
'HAND WARMER SCOTTY DOG DESIGN',
'ROSE COTTAGE KEEPSAKE BOX ',
'LOVE HEART NAPKIN BOX ',
'ORIGAMI SANDLEWOOD INCENSE+FLOWER',
'ORIGAMI VANILLA INCENSE/CANDLE SET ',
'ORIGAMI JASMINE INCENSE/CANDLE SET',
'PORCELAIN BUTTERFLY OIL BURNER',
'RED RETROSPOT LUGGAGE TAG',
'RED HEART LUGGAGE TAG',
'STRAWBERRY DREAM CHILDS UMBRELLA',
'BLACK MINI TAPE MEASURE ',

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'PORCELAIN T-LIGHT HOLDERS ASSORTED',
'SANDWICH BATH SPONGE',
'12 PENCIL SMALL TUBE WOODLAND',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'ROSE DU SUD COSMETICS BAG',
'VINTAGE BILLBOARD TEA MUG',
'VINTAGE BILLBOARD DRINK ME MUG',
'CHRISTMAS TOILET ROLL',
'OWL DOORSTOP',
'JINGLE BELLS TREE DECORATION',
'BEWARE OF THE CAT METAL SIGN ',
"YOU'RE CONFUSING ME METAL SIGN ",
'POTTERING IN THE SHED METAL SIGN',
'GIN + TONIC DIET METAL SIGN',
'PINK  HONEYCOMB PAPER BALL ',
'SET OF 72 RETROSPOT PAPER  DOILIES',
'VICTORIAN SEWING BOX LARGE',
'IVY HEART WREATH',
'BROWN CHECK CAT DOORSTOP ',
'RED GINGHAM ROSE JEWELLERY BOX',
'CHICK GREY HOT WATER BOTTLE',
'PINK HEART DOTS HOT WATER BOTTLE',
'RED WHITE SCARF  HOT WATER BOTTLE',
'ASSORTED MINI MADRAS NOTEBOOK',
'ASSORTED TUTTI FRUTTI KEYRING BALL',
'GLASS  BEURRE DISH',
'VINTAGE GLASS COFFEE CADDY',
'VINTAGE SHELLS PRINT',
'3 HOOK HANGER MAGIC GARDEN',
'5 HOOK HANGER MAGIC TOADSTOOL',
'HOOK, 1 HANGER ,MAGIC GARDEN',
'ORGANISER WOOD ANTIQUE WHITE ',
'RED KITCHEN SCALES',
'HOT WATER BOTTLE BABUSHKA ',
'RED TEA TOWEL CLASSIC DESIGN',
'BLUE TEA TOWEL CLASSIC DESIGN',
'DOVE DECORATION PAINTED ZINC ',
'VICTORIAN SEWING BOX LARGE',
'PINK FLOWER FABRIC PONY',
'METAL 4 HOOK HANGER FRENCH CHATEAU',
'BLUE SPOT CERAMIC DRAWER KNOB',
'FELTCRAFT CUSHION OWL',
'FELTCRAFT CUSHION RABBIT',
'CREAM SWEETHEART LETTER RACK',
'PINK HEART DOTS HOT WATER BOTTLE',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'RED WOOLLY HOTTIE WHITE HEART.',
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'SET OF 3 BABUSHKA STACKING TINS',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'HOT WATER BOTTLE BABUSHKA ',
'VICTORIAN SEWING BOX SMALL ',
'BEACH HUT KEY CABINET',
'HOME SMALL WOOD LETTERS',
'SILK PURSE BABUSHKA RED',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'CHILLI LIGHTS',
'CHRISTMAS TOILET ROLL',
'HEART OF WICKER LARGE',
'SWEETHEART RECIPE BOOK STAND',
'CHILLI LIGHTS',
'BREAD BIN DINER STYLE IVORY',
'RECIPE BOX BLUE SKETCHBOOK DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER BIRD DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER RED RETROSPOT',
'RECIPE BOX WITH METAL HEART',
'ART LIGHTS,FUNK MONKEY',
'SET 12 LAVENDER BOTANICAL T-LIGHTS',
'PLEASE ONE PERSON METAL SIGN',
'HAND WARMER BIRD DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER RED RETROSPOT',
'3 HOOK PHOTO SHELF ANTIQUE WHITE',
'NOEL WOODEN BLOCK LETTERS ',
'NEWSPAPER STAND',
'WOODEN TREE CHRISTMAS SCANDINAVIAN',
'CHRISTMAS HANGING TREE WITH BELL',
'JINGLE BELLS TREE DECORATION',
'CHRISTMAS HANGING HEART WITH BELL',
'GLITTER CHRISTMAS TREE',
'CHRISTMAS GARLAND STARS,TREES',
'WHITE CHRISTMAS GARLAND STARS TREES',
'VINTAGE BILLBOARD DRINK ME MUG',
'COSY HOUR GIANT TUBE MATCHES',
'SET OF 3 BABUSHKA STACKING TINS',
'MA CAMPAGNE CUTLERY BOX',
'YULETIDE IMAGES GIFT WRAP SET',
'WICKER WREATH LARGE',
'SMALL FOLKART STAR CHRISTMAS DEC',
'SMALLFOLKART BAUBLE CHRISTMAS DEC',
'SMALL HANGING GLASS+ZINC LANTERN',
'SET/3 CHRISTMAS DECOUPAGE CANDLES',

'S/15 SILVER GLASS BAUBLES IN BAG',
'GROW YOUR OWN PLANT IN A CAN ',
'GREEN CHRISTMAS TREE STRING 20LIGHT',
'NOEL WOODEN BLOCK LETTERS ',
'WOODEN TREE CHRISTMAS SCANDINAVIAN',
'CHRISTMAS HANGING HEART WITH BELL',
'GLITTER CHRISTMAS TREE',
'WICKER WREATH LARGE',
'HEART OF WICKER SMALL',
'FINE WICKER HEART ',
'T-LIGHT GLASS FLUTED ANTIQUE',
'RED WOOLLY HOTTIE WHITE HEART.',
'SET OF 3 COLOURED FLYING DUCKS',
'HOT WATER BOTTLE BABUSHKA ',
'CHICK GREY HOT WATER BOTTLE',
'HAND WARMER OWL DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'ALARM CLOCK BAKELIKE GREEN',
'ALARM CLOCK BAKELIKE ORANGE',
'GINGERBREAD MAN COOKIE CUTTER',
'SOLDIERS EGG CUP ',
'RED WOOLLY HOTTIE WHITE HEART.',
'BREAD BIN DINER STYLE PINK',
'ALARM CLOCK BAKELIKE GREEN',
'ALARM CLOCK BAKELIKE ORANGE',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'HAND WARMER BIRD DESIGN',
'CHRISTMAS TOILET ROLL',
'HEADS AND TAILS SPORTING FUN',
'RECIPE BOX WITH METAL HEART',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'COLOUR GLASS. STAR T-LIGHT HOLDER',
'SET OF 2 TINS VINTAGE BATHROOM ',
'SET OF 4 ROSE BOTANICAL CANDLES',
'LOVE HEART SOCK HANGER',
'SCOTTIES CHILDRENS APRON',
'CREAM SWEETHEART LETTER RACK',
'NOEL WOODEN BLOCK LETTERS ',
'RED WHITE SCARF HOT WATER BOTTLE',
'CHICK GREY HOT WATER BOTTLE',
'ORIGAMI VANILLA INCENSE/CANDLE SET ',
'ORIGAMI JASMINE INCENSE/CANDLE SET',
'ORIGAMI VANILLA INCENSE CONES',
'PINK POLKADOT CHILDRENS UMBRELLA',
'MOUSEY LONG LEGS SOFT TOY',
'BLACK MINI TAPE MEASURE ',
'BLUE POLKADOT WASHING UP GLOVES',

'PORCELAIN T-LIGHT HOLDERS ASSORTED',
'SANDWICH BATH SPONGE',
'12 PENCIL SMALL TUBE WOODLAND',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'VINTAGE RED TEATIME MUG',
'VINTAGE BILLBOARD TEA MUG',
'VINTAGE BILLBOARD DRINK ME MUG',
'CHRISTMAS TOILET ROLL',
'LARGE CAKE TOWEL PINK SPOTS',
'BEWARE OF THE CAT METAL SIGN ',
'POTTERING IN THE SHED METAL SIGN',
'PLEASE ONE PERSON METAL SIGN',
'VICTORIAN SEWING BOX MEDIUM',
'VICTORIAN SEWING BOX LARGE',
'SALLE DE BAIN HOOK',
'VINTAGE KITCHEN PRINT FRUITS',
'VINTAGE KITCHEN PRINT SEAFOOD',
'STRIPEY CHOCOLATE NESTING BOXES',
'IVY HEART WREATH',
'RED GINGHAM ROSE JEWELLERY BOX',
'12 IVORY ROSE PEG PLACE SETTINGS',
'CHICK GREY HOT WATER BOTTLE',
'PINK HEART DOTS HOT WATER BOTTLE',
'RED WHITE SCARF HOT WATER BOTTLE',
'CERAMIC BIRDHOUSE CRESTED TIT SMALL',
"Dr. Jam's Arouzer Stress Ball",
'ASSORTED TUTTI FRUTTI NOTEBOOK',
'ASSORTED TUTTI FRUTTI SMALL PURSE',
'GLASS BEURRE DISH',
'SMALL MEDINA STAMPED METAL BOWL ',
'BIG DOUGHNUT FRIDGE MAGNETS',
'STAR PORTABLE TABLE LIGHT ',
'RECIPE BOX WITH METAL HEART',
'CHRISTMAS TREE DECORATION WITH BELL',
'CHRISTMAS TREE STAR DECORATION',
'CHRISTMAS HANGING TREE WITH BELL',
'GLITTER HEART GARLAND WITH BELLS ',
'ASSORTED CREEPY CRAWLIES',
'POTTING SHED TEA MUG',
'TRADITIONAL WOODEN SKIPPING ROPE',
'POTTING SHED TWINE',
'SET OF 36 PAISLEY FLOWER DOILIES',
'RIBBON REEL LACE DESIGN ',
'PAPER CHAIN KIT EMPIRE',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'NOEL WOODEN BLOCK LETTERS ',
'FELTCRAFT 6 FLOWER FRIENDS',

'HEART GARLAND RUSTIC PADDED',
'CAKE STAND VICTORIAN FILIGREE LARGE',
'LARGE POPCORN HOLDER ',
'HOOK, 1 HANGER ,MAGIC GARDEN',
'WASH BAG VINTAGE ROSE PAISLEY',
'MONEY BOX BISCUITS DESIGN',
'SILK PURSE BABUSHKA RED',
'CAST IRON HOOK GARDEN TROWEL',
'GUMBALL COAT RACK',
'HEART OF WICKER SMALL',
'PICNIC BASKET WICKER LARGE',
'FELTCRAFT CUSHION RABBIT',
'CARD HOLDER GINGHAM HEART',
'RED KITCHEN SCALES',
'HAND WARMER RED RETROSPOT',
'RECIPE BOX BLUE SKETCHBOOK DESIGN',
'WICKER WREATH LARGE',
'CARD DOLLY GIRL ',
'ALARM CLOCK BAKELIKE GREEN',
'SET OF 6 RIBBONS VINTAGE CHRISTMAS',
'PURPLE DRAWERKNOB ACRYLIC EDWARDIAN',
'T-LIGHT GLASS FLUTED ANTIQUE',
'SWEETHEART RECIPE BOOK STAND',
'SET OF 6 T-LIGHTS SNOWMEN',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'HOT WATER BOTTLE BABUSHKA ',
'CREAM SWEETHEART EGG HOLDER',
'FINE WICKER HEART ',
'LOVE HEART NAPKIN BOX ',
'SOAP DISH BROCANTE',
'HAND WARMER OWL DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER BIRD DESIGN',
'WOODEN ADVENT CALENDAR RED',
'ROSE COTTAGE KEEPSAKE BOX ',
'SOLDIERS EGG CUP ',
'BLUE FELT HANGING HEART W FLOWER',
'PINK FELT HANGING HEART W FLOWER',
'SMALLFOLKART BAUBLE CHRISTMAS DEC',
'FOLKART HEART NAPKIN RINGS',
'RETRO COFFEE MUGS ASSORTED',
'PINK BREAKFAST CUP AND SAUCER ',
'SUNSET COLOUR CHUNKY KNITTED THROW',
'SCOTTIES CHILDRENS APRON',
'PINK FAIRY CAKE CHILDRENS APRON',
'COLOUR GLASS. STAR T-LIGHT HOLDER',
'SET/3 CHRISTMAS DECOUPAGE CANDLES',

'SET OF 2 CHRISTMAS DECOUPAGE CANDLE',
'CORONA MEXICAN TRAY',
'ART LIGHTS,FUNK MONKEY',
'CHILLI LIGHTS',
'LAUNDRY 15C METAL SIGN',
"FANNY'S REST STOPMETAL SIGN",
'METAL SIGN,CUPCAKE SINGLE HOOK',
'RED WOOLLY HOTTIE WHITE HEART.',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'YELLOW METAL CHICKEN HEART ',
'PACK 20 ENGLISH ROSE PAPER NAPKINS',
'3D SHEET OF CAT STICKERS',
'MIXED NUTS LIGHT GREEN BOWL',
'GRASS HOPPER WOODEN WALL CLOCK ',
'S/15 SILVER GLASS BAUBLES IN BAG',
'LARGE TAHITI BEACH BAG',
'GREEN ROSE WASHBAG',
'RECTANGULAR SHAPED MIRROR',
'SET OF 3 CONEY ISLAND OVAL BOXES',
'ENVELOPE 50 ROMANTIC IMAGES',
'ENVELOPE 50 BLOSSOM IMAGES',
'YULETIDE IMAGES GIFT WRAP SET',
'SET/4 BLUE FLOWER CANDLES IN BOWL',
'CREAM SWEETHEART LETTER RACK',
'JUMBO BAG STRAWBERRY',
'BLUE DRAGONFLY HELICOPTER',
'LADIES & GENTLEMEN METAL SIGN',
'SET OF 3 BABUSHKA STACKING TINS',
'SET/3 DECOUPAGE STACKING TINS',
'PAIR BUTTERFLY HAIR CLIPS',
'BLUE SWEETHEART BRACELET',
'PINK ENAMEL+GLASS HAIR COMB',
'DOTCOM POSTAGE',
'WOODEN FRAME ANTIQUE WHITE ',
'GUMBALL COAT RACK',
'RED RETROSPOT PURSE ',
'CHILDS GARDEN BRUSH PINK',
'LADYBIRD + BEE RAFFIA FOOD COVER',
'BLACK RECORD COVER FRAME',
'NOEL WOODEN BLOCK LETTERS ',
'CHILDRENS GARDEN GLOVES BLUE',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'VANILLA SCENT CANDLE JEWELLED BOX',
'CHRISTMAS DECOUPAGE CANDLE',
'SET/4 GARDEN ROSE DINNER CANDLE',
'GOLD PRINT PAPER BAG',
'PORCELAIN ROSE LARGE ',

'PORCELAIN ROSE SMALL',
'ROSE COTTAGE KEEPSAKE BOX ',
'ALARM CLOCK BAKELIKE GREEN',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'SOAP DISH BROCANTE',
'SANDWICH BATH SPONGE',
'PLEASE ONE PERSON METAL SIGN',
'FELTCRAFT DOLL MARIA',
'PARTY METAL SIGN ',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'SOAP DISH BROCANTE',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'HAND WARMER OWL DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER RED RETROSPOT',
'HAND WARMER UNION JACK',
'PINK/YELLOW FLOWERS HANDBAG',
'SALLE DE BAIN HOOK',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'FELTCRAFT 6 FLOWER FRIENDS',
'CHRISTMAS CARD STACK OF PRESENTS',

'SET 12 KIDS COLOUR CHALK STICKS',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'HOT WATER BOTTLE BABUSHKA ',
'GUMBALL COAT RACK',
'BLACK RECORD COVER FRAME',
'CHILLI LIGHTS',
'CACTI T-LIGHT CANDLES',
'ART LIGHTS,FUNK MONKEY',
'STAR PORTABLE TABLE LIGHT ',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'LARGE POPCORN HOLDER ',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'TOAST ITS - I LOVE YOU ',
'BANK ACCOUNT GREETING CARD ',
'CARD DOLLY GIRL ',
'PENNY FARTHING BIRTHDAY CARD',
'CHRISTMAS DECOUPAGE CANDLE',
'BLUE SPOT CERAMIC DRAWER KNOB',
'WHITE SPOT BLUE CERAMIC DRAWER KNOB',
'PURPLE DRAWERKNOB ACRYLIC EDWARDIAN',
'WOODEN FRAME ANTIQUE WHITE ',
'HOOK, 1 HANGER ,MAGIC GARDEN',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'VINTAGE BILLBOARD TEA MUG',
'VINTAGE BILLBOARD DRINK ME MUG',
'ALARM CLOCK BAKELIKE GREEN',
'BLUE GIANT GARDEN THERMOMETER',
'IVORY GIANT GARDEN THERMOMETER',
'FELTCRAFT CUSHION OWL',
'FELTCRAFT CUSHION RABBIT',
'IVORY GIANT GARDEN THERMOMETER',
'GLASS BELL JAR LARGE',
'SET 3 WICKER OVAL BASKETS W LIDS',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',

'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'RETRO COFFEE MUGS ASSORTED',
'CHICK GREY HOT WATER BOTTLE',
'HOT WATER BOTTLE BABUSHKA ',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'SOLDIERS EGG CUP ',
'IVORY GIANT GARDEN THERMOMETER',
'PLEASE ONE PERSON METAL SIGN',
'WOODEN FRAME ANTIQUE WHITE ',
'SET OF 72 RETROSPOT PAPER DOILIES',
'RED GINGHAM ROSE JEWELLERY BOX',
'I CAN ONLY PLEASE ONE PERSON MUG',
'POTTING SHED TEA MUG',
'LADIES & GENTLEMEN METAL SIGN',
'HAND OVER THE CHOCOLATE   SIGN ',
'PLEASE ONE PERSON METAL SIGN',
'PICNIC BASKET WICKER SMALL',
'FINE WICKER HEART ',
'RED WOOLLY HOTTIE WHITE HEART.',
'HOT WATER BOTTLE TEA AND SYMPATHY',
'LARGE POPCORN HOLDER ',
'HAND WARMER BIRD DESIGN',
'HAND WARMER UNION JACK',
'HAND WARMER UNION JACK',
'TEATIME PEN CASE & PENS',
'BLUE DRAGONFLY HELICOPTER',
'WICKER WREATH LARGE',
'HAND WARMER SCOTTY DOG DESIGN',
'CHRISTMAS DECOUPAGE CANDLE',
'SET/9 CHRISTMAS T-LIGHTS SCENTED ',
'GREY FLORAL FELTCRAFT SHOULDER BAG',
'CHRISTMAS TOILET ROLL',
'FELTCRAFT CUSHION OWL',
'RED GINGHAM ROSE JEWELLERY BOX',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'RED RETROSPOT TRADITIONAL TEAPOT ',
'DAIRY MAID PUDDING BOWL',
'DO NOT TOUCH MY STUFF DOOR HANGER ',
'KEEP OUT BOYS DOOR HANGER ',
'PICNIC BASKET WICKER SMALL',
'HEART OF WICKER SMALL',
'CREAM CUPID HEARTS COAT HANGER',

'HAND WARMER RED RETROSPOT',
'HAND WARMER BIRD DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'HAND WARMER UNION JACK',
'HAND WARMER RED RETROSPOT',
'HAND WARMER BIRD DESIGN',
'I CAN ONLY PLEASE ONE PERSON MUG',
'GREY FLORAL FELTCRAFT SHOULDER BAG',
'WOODEN TREE CHRISTMAS SCANDINAVIAN',
'HAND WARMER BIRD DESIGN',
'HAND WARMER UNION JACK',
'HAND WARMER RED RETROSPOT',
'WOODEN TREE CHRISTMAS SCANDINAVIAN',
'COSY SLIPPER SHOES SMALL RED ',
'CHILLI LIGHTS',
'HEART OF WICKER SMALL',
'WHITE JEWELLED HEART DECORATION',
'FINE WICKER HEART ',
'POLKADOT PEN',
'PACK 3 BOXES CHRISTMAS PANNETONE',
'ALARM CLOCK BAKELIKE ORANGE',
'STRIPEY CHOCOLATE NESTING BOXES',
'CHRISTMAS TREE STAR DECORATION',
'CHRISTMAS TREE DECORATION WITH BELL',
'SET/3 CHRISTMAS DECOUPAGE CANDLES',
'CHINESE DRAGON PAPER LANTERNS',
'MILK PAN PINK POLKADOT',
'DOORMAT BLACK FLOCK ',
'SCOTTIES CHILDRENS APRON',
'PINK FAIRY CAKE CHILDRENS APRON',
'SMALL PINK MAGIC CHRISTMAS TREE',
'KEEP OUT BOYS DOOR HANGER ',
'PICNIC BASKET WICKER LARGE',
'SCENTED CANDLE IN DIGITALIS TIN',
'ORGANISER WOOD ANTIQUE WHITE ',
'CREAM CUPID HEARTS COAT HANGER',
'SOLDIERS EGG CUP ',
'HAND WARMER UNION JACK',
'HAND WARMER BIRD DESIGN',
'HAND WARMER SCOTTY DOG DESIGN',
'KINGS CHOICE GIANT TUBE MATCHES',
'RED WOOLLY HOTTIE WHITE HEART.',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',

'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'BLUE DRAGONFLY HELICOPTER',
'STAR PORTABLE TABLE LIGHT ',
'CLEAR MILKSHAKE GLASS',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'CHARLIE AND LOLA TABLE TINS',
'BLUE POLKADOT PLATE ',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'MINI CAKE STAND T-LIGHT HOLDER',
'CREAM SWEETHEART LETTER RACK',
'SET OF 3 COLOURED FLYING DUCKS',
'SHOE SHINE BOX ',
'BREAD BIN DINER STYLE PINK',
'RED RETROSPOT TRADITIONAL TEAPOT ',
'GINGERBREAD MAN COOKIE CUTTER',
'VANILLA INCENSE 40 CONES IN TIN',
'COLUMBIAN CANDLE ROUND ',
'ZINC FINISH 15CM PLANTER POTS',
'SMALL SQUARE CUT GLASS CANDLESTICK',
'LADYBIRD + BEE RAFFIA FOOD COVER',
'SILK PURSE BABUSHKA RED',
'SOLDIERS EGG CUP ',
'LOVE HEART NAPKIN BOX ',
'SKULLS GREETING CARD',
'HEART OF WICKER LARGE',
'HEART OF WICKER SMALL',
'SET OF 36 PAISLEY FLOWER DOILIES',
'12 PENCILS TALL TUBE POSY',
'BLUE DRAGONFLY HELICOPTER',
'PINK HEART SHAPE PHOTO FRAME',
'SET 12 KIDS COLOUR CHALK STICKS',
'ALARM CLOCK BAKELIKE ORANGE',
'GREEN JUICY FRUIT PHOTO FRAME',
'ASSORTED CREEPY CRAWLIES',

'PINK FAIRY CAKE CHILDRENS APRON',
'SWEETHEART RECIPE BOOK STAND',
'VICTORIAN SEWING BOX SMALL ',
'VICTORIAN SEWING BOX LARGE',
'COSY HOUR GIANT TUBE MATCHES',
'WRAP PINK FAIRY CAKES ',
'BABY BOOM RIBBONS ',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER OWL DESIGN',
'HAND WARMER UNION JACK',
'HAND WARMER RED RETROSPOT',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'12 PENCILS SMALL TUBE RED RETROSPOT',
'RED WOOLLY HOTTIE WHITE HEART.',
'DIAMANTE BOW BROOCH BLACK COLOUR',
'DIAMANTE BOW BROOCH RED COLOUR',
'CUT GLASS HEXAGON T-LIGHT HOLDER',
'GOLD PRINT PAPER BAG',
'RED TEA TOWEL CLASSIC DESIGN',
'CHRISTMAS LIGHTS 10 VINTAGE BAUBLES',
'CLAM SHELL LARGE',
'PINK TALL PORCELAIN T-LIGHT HOLDER ',
'HAND WARMER SCOTTY DOG DESIGN',
'HAND WARMER BIRD DESIGN',
'HAND WARMER UNION JACK',
'RED GINGHAM ROSE JEWELLERY BOX',
'GREY FLORAL FELTCRAFT SHOULDER BAG',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'CREAM CUPID HEARTS COAT HANGER',
'RETRO COFFEE MUGS ASSORTED',
'VINTAGE BILLBOARD DRINK ME MUG',
'WOOD 2 DRAWER CABINET WHITE FINISH',
'WOODEN FRAME ANTIQUE WHITE ',
'KNITTED UNION FLAG HOT WATER BOTTLE',
'RED WOOLLY HOTTIE WHITE HEART.',
'HAND WARMER RED POLKA DOT',
'HAND WARMER UNION JACK',
'SOLDIERS EGG CUP ',
'BLACK RECORD COVER FRAME',

```
'HEART OF WICKER LARGE',
'S/15 SILVER GLASS BAUBLES IN BAG',
'GARDEN METAL SIGN ',
'CHRYSANTHEMUM POCKET BOOK ',
'GARDEN PATH POCKET BOOK',
'LARGE POPCORN HOLDER ',
'GREY FLORAL FELTCRAFT SHOULDER BAG',
'FELTCRAFT CUSHION RABBIT',
'FROG SOCK PUPPET',
'PINK HORSE SOCK PUPPET',
'PAPER BUNTING COLOURED LACE',
'HAND WARMER BIRD DESIGN',
'HAND WARMER UNION JACK',
'HAND WARMER BIRD DESIGN',
'HAND WARMER OWL DESIGN',
…]
```

[207]:
```python
## Making a series of the description value I got for the Description Null␣
↪values.
idx_list= df[df["Description"].isnull()].index
desc_data = pd.Series(list_description_for_missing,index = idx_list)
```

[208]:
```python
desc_data
```

[208]:
```
622            CREAM CUPID HEARTS COAT HANGER
1970      KNITTED UNION FLAG HOT WATER BOTTLE
1971          RED WOOLLY HOTTIE WHITE HEART.
1972               HAND WARMER UNION JACK
1987            HAND WARMER RED POLKA DOT
                        ...
535322             WHITE WIRE EGG HOLDER
535326           WAKE UP COCKEREL TILE HOOK
535332          ENVELOPE 50 ROMANTIC IMAGES
536981          ENVELOPE 50 BLOSSOM IMAGES
538554              JUMBO BAG STRAWBERRY
Length: 1454, dtype: object
```

[209]:
```python
## Filling the Description missing values
df["Description"].fillna(desc_data, inplace= True)
df.isnull().sum()
```

[209]:
```
InvoiceNo      0
StockCode      0
Description    0
Quantity       0
InvoiceDate    0
UnitPrice      0
```

```
        CustomerID      0
        Country         0
        dtype: int64
```

[210]: `df`

[210]:
```
             InvoiceNo StockCode                          Description  Quantity  \
        0       536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
        1       536365     71053                  WHITE METAL LANTERN         6
        2       536365    84406B       CREAM CUPID HEARTS COAT HANGER         8
        3       536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE         6
        4       536365    84029E       RED WOOLLY HOTTIE WHITE HEART.         6
        ...        ...       ...                                  ...       ...
        541904  581587     22613           PACK OF 20 SPACEBOY NAPKINS       12
        541905  581587     22899            CHILDREN'S APRON DOLLY GIRL        6
        541906  581587     23254            CHILDRENS CUTLERY DOLLY GIRL       4
        541907  581587     23255          CHILDRENS CUTLERY CIRCUS PARADE     4
        541908  581587     22138            BAKING SET 9 PIECE RETROSPOT      3

                        InvoiceDate  UnitPrice  CustomerID         Country
        0       2010-12-01 08:26:00       2.55       17850  United Kingdom
        1       2010-12-01 08:26:00       3.39       17850  United Kingdom
        2       2010-12-01 08:26:00       2.75       17850  United Kingdom
        3       2010-12-01 08:26:00       3.39       17850  United Kingdom
        4       2010-12-01 08:26:00       3.39       17850  United Kingdom
        ...                     ...        ...         ...             ...
        541904  2011-12-09 12:50:00       0.85       12680          France
        541905  2011-12-09 12:50:00       2.10       12680          France
        541906  2011-12-09 12:50:00       4.15       12680          France
        541907  2011-12-09 12:50:00       4.15       12680          France
        541908  2011-12-09 12:50:00       4.95       12680          France

        [536641 rows x 8 columns]
```

[211]: `df.dtypes`

[211]:
```
        InvoiceNo       object
        StockCode       object
        Description     object
        Quantity         int64
        InvoiceDate     object
        UnitPrice      float64
        CustomerID       int64
        Country         object
        dtype: object
```

```
[212]:  df.InvoiceDate= pd.to_datetime(df["InvoiceDate"], dayfirst = True)
        df["InvoiceDate"]
```

```
[212]:  0          2010-12-01 08:26:00
        1          2010-12-01 08:26:00
        2          2010-12-01 08:26:00
        3          2010-12-01 08:26:00
        4          2010-12-01 08:26:00
                          ...
        541904     2011-12-09 12:50:00
        541905     2011-12-09 12:50:00
        541906     2011-12-09 12:50:00
        541907     2011-12-09 12:50:00
        541908     2011-12-09 12:50:00
        Name: InvoiceDate, Length: 536641, dtype: datetime64[ns]
```

```
[213]:  df.dtypes
```

```
[213]:  InvoiceNo              object
        StockCode              object
        Description            object
        Quantity                int64
        InvoiceDate    datetime64[ns]
        UnitPrice             float64
        CustomerID              int64
        Country                object
        dtype: object
```

```
[214]:  ## Let's create a seperate column for all the InvoiceDate column
        df['year']= df['InvoiceDate'].dt.year

        df["month"]= df["InvoiceDate"].dt.month

        df["day"]= df["InvoiceDate"].dt.day

        df["weekday"]= df["InvoiceDate"].dt.weekday

        dw_mapping= {
            0: "Monday",
            1: "Tuesday",
            2: "Wednesday",
            3: "Thursday",
            4: "Friday",
            5: "Saturday",
            6: "Sunday"
        }
```

```
df["dayofweek"]= df["InvoiceDate"].dt.weekday.map(dw_mapping)
```

[215]:
```
df.head()
```

[215]:
```
   InvoiceNo StockCode                       Description  Quantity  \
0     536365    85123A  WHITE HANGING HEART T-LIGHT HOLDER         6
1     536365     71053                WHITE METAL LANTERN         6
2     536365    84406B    CREAM CUPID HEARTS COAT HANGER          8
3     536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE        6
4     536365    84029E       RED WOOLLY HOTTIE WHITE HEART.        6

          InvoiceDate  UnitPrice  CustomerID         Country  year  month  \
0 2010-12-01 08:26:00       2.55       17850  United Kingdom  2010     12
1 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
2 2010-12-01 08:26:00       2.75       17850  United Kingdom  2010     12
3 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
4 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12

   day  weekday  dayofweek
0    1        2  Wednesday
1    1        2  Wednesday
2    1        2  Wednesday
3    1        2  Wednesday
4    1        2  Wednesday
```

[216]:
```
df.dtypes
```

[216]:
```
InvoiceNo              object
StockCode             object
Description           object
Quantity               int64
InvoiceDate    datetime64[ns]
UnitPrice            float64
CustomerID             int64
Country               object
year                   int64
month                  int64
day                    int64
weekday                int64
dayofweek             object
dtype: object
```

[217]:
```
## Calulating the sales price
df["sales"]= df["Quantity"]* df["UnitPrice"]
df["sales"].head()
```

32

```
[217]: 0    15.30
       1    20.34
       2    22.00
       3    20.34
       4    20.34
       Name: sales, dtype: float64
```

```
[218]: df.describe().T
```

```
[218]:                count          mean           std          min       25%  \
       Quantity    536641.0      9.620029    219.130156    -80995.00      1.00
       UnitPrice   536641.0      4.632656     97.233118    -11062.06      1.25
       CustomerID  536641.0  15282.630153   1482.756881     12346.00  14367.00
       year        536641.0   2010.921771      0.268532      2010.00   2011.00
       month       536641.0      7.544820      3.508696         1.00      5.00
       day         536641.0     15.024640      8.663351         1.00      7.00
       weekday     536641.0      2.423889      1.839870         0.00      1.00
       sales       536641.0     18.123861    380.656263   -168469.60      3.75

                        50%       75%        max
       Quantity        3.00     10.00    80995.0
       UnitPrice       2.08      4.13    38970.0
       CustomerID  15287.00  16241.00    18287.0
       year         2011.00   2011.00     2011.0
       month           8.00     11.00       12.0
       day            15.00     22.00       31.0
       weekday         2.00      4.00        6.0
       sales           9.87     17.40   168469.6
```

1.3 Exploratory Data Analysis

Sales Distribution * Which country has the maximum customer?

- Which year has the most sales?

- Which country has the most transaction sales?

- Which month has the most sales?

- Which day has the most sales?

- Top 10 most purchased items.

```
[219]: df
```

```
[219]:    InvoiceNo StockCode                          Description  Quantity  \
       0     536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
       1     536365     71053                  WHITE METAL LANTERN         6
       2     536365    84406B       CREAM CUPID HEARTS COAT HANGER         8
       3     536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE         6
```

```
4          536365      84029E      RED WOOLLY HOTTIE WHITE HEART.              6
...            ...         ...                                          ...      ...
541904     581587       22613      PACK OF 20 SPACEBOY NAPKINS                12
541905     581587       22899      CHILDREN'S APRON DOLLY GIRL                 6
541906     581587       23254      CHILDRENS CUTLERY DOLLY GIRL                4
541907     581587       23255      CHILDRENS CUTLERY CIRCUS PARADE             4
541908     581587       22138      BAKING SET 9 PIECE RETROSPOT                3

                 InvoiceDate  UnitPrice  CustomerID         Country  year  \
0       2010-12-01 08:26:00       2.55       17850  United Kingdom  2010
1       2010-12-01 08:26:00       3.39       17850  United Kingdom  2010
2       2010-12-01 08:26:00       2.75       17850  United Kingdom  2010
3       2010-12-01 08:26:00       3.39       17850  United Kingdom  2010
4       2010-12-01 08:26:00       3.39       17850  United Kingdom  2010
...                     ...        ...         ...             ...   ...
541904  2011-12-09 12:50:00       0.85       12680          France  2011
541905  2011-12-09 12:50:00       2.10       12680          France  2011
541906  2011-12-09 12:50:00       4.15       12680          France  2011
541907  2011-12-09 12:50:00       4.15       12680          France  2011
541908  2011-12-09 12:50:00       4.95       12680          France  2011

        month  day  weekday  dayofweek   sales
0          12    1        2  Wednesday   15.30
1          12    1        2  Wednesday   20.34
2          12    1        2  Wednesday   22.00
3          12    1        2  Wednesday   20.34
4          12    1        2  Wednesday   20.34
...       ...  ...      ...        ...     ...
541904     12    9        4     Friday   10.20
541905     12    9        4     Friday   12.60
541906     12    9        4     Friday   16.60
541907     12    9        4     Friday   16.60
541908     12    9        4     Friday   14.85

[536641 rows x 14 columns]
```
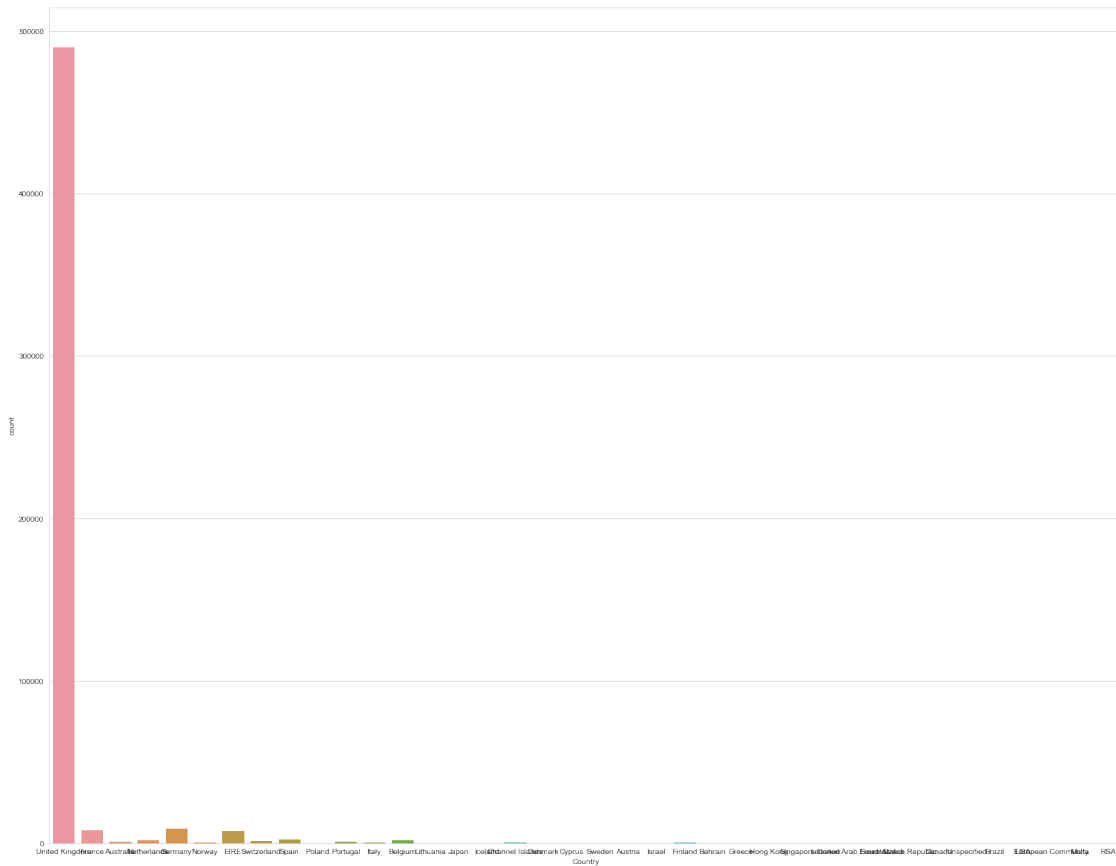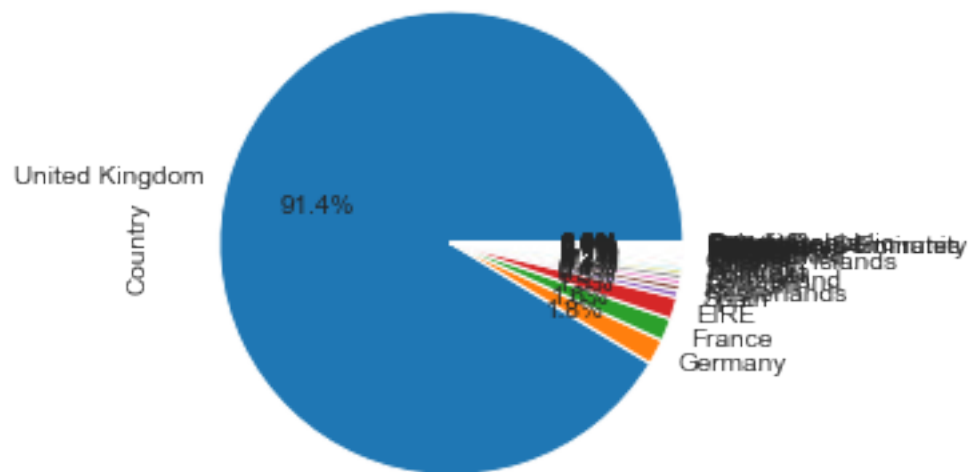
1. Which country has the maximum customer?

```python
plt.subplots(figsize= (25,20))
sns.countplot(x='Country', data= df);
```

United Kingdom has the largest customer base

```
[221]: df["Country"].value_counts().plot(kind= "pie", autopct= "%0.1f%%")
```
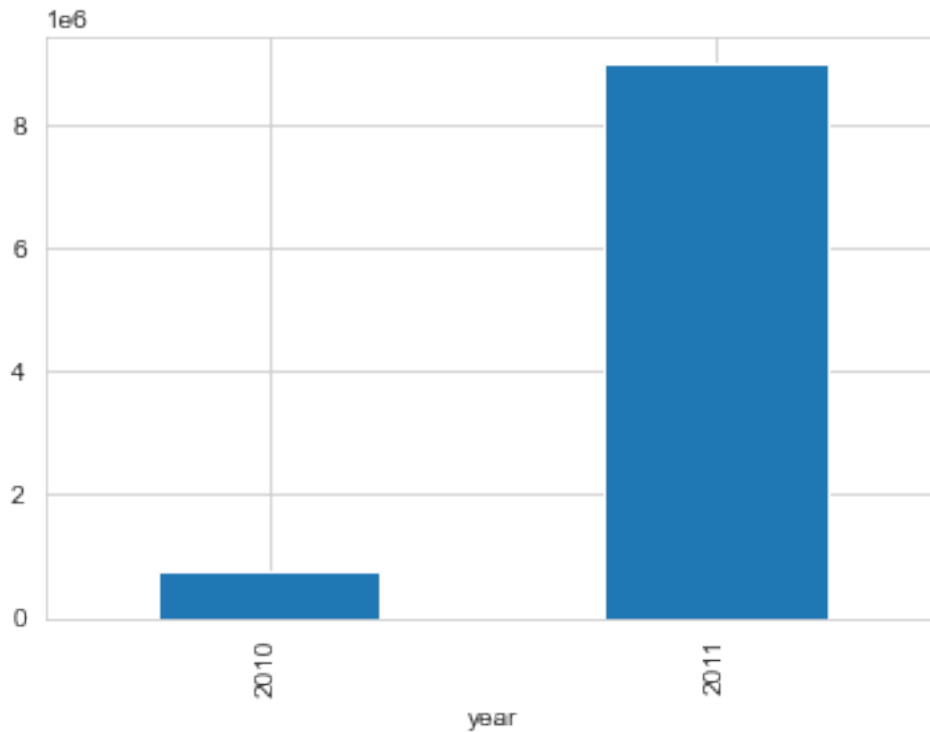
[221]: <AxesSubplot: ylabel='Country'>

Among all the countries 94% of the customer belongs to United Kingdom

2. Which year has the most sales?

[222]:
```
df.groupby(['year'])["sales"].sum().plot(kind= "bar")
```

[222]: <AxesSubplot: xlabel='year'>

Year 2011 has the largest sales.
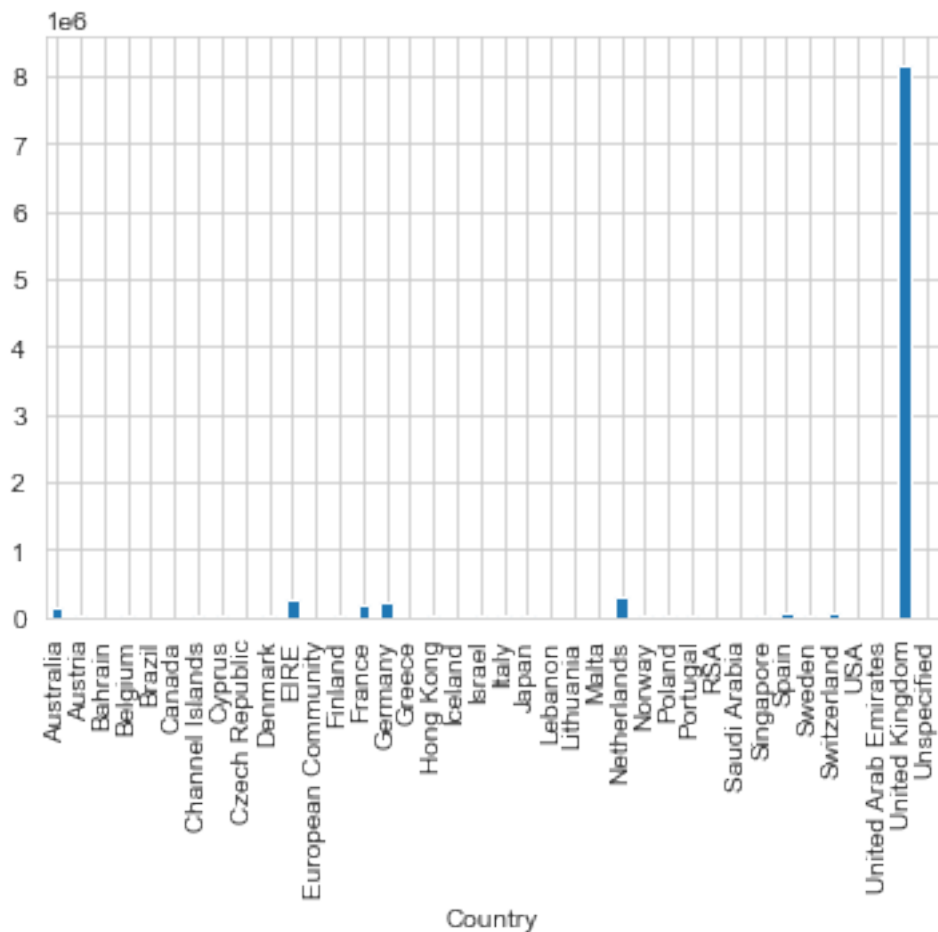
```
[223]: df.groupby(['year'])["sales"].sum()
```

```
[223]: year
       2010     746723.610
       2011    8979283.344
       Name: sales, dtype: float64
```

3. Which country has the most transaction sales?

```
[224]: df.groupby(["Country"])["sales"].sum().plot(kind= "bar")
```

```
[224]: <AxesSubplot: xlabel='Country'>
```

```
[225]:  df.groupby(by=['Country'])["sales"].sum().sort_values(ascending=False)
```

```
[225]:  Country
        United Kingdom        8167128.184
        Netherlands            284661.540
        EIRE                   262993.380
        Germany                221509.470
        France                 197317.110
        Australia              137009.770
        Switzerland             56363.050
        Spain                   54756.030
        Belgium                 40910.960
        Sweden                  36585.410
        Japan                   35340.620
        Norway                  35163.460
        Portugal                29302.970
        Finland                 22326.740
```

```
Channel Islands            20076.390
Denmark                    18768.140
Italy                      16890.510
Cyprus                     12858.760
Austria                    10154.320
Hong Kong                   9908.240
Singapore                   9120.390
Israel                      7901.970
Poland                      7213.140
Unspecified                 4740.940
Greece                      4710.520
Iceland                     4310.000
Canada                      3666.380
Malta                       2505.470
United Arab Emirates        1902.280
USA                         1730.920
Lebanon                     1693.880
Lithuania                   1661.060
European Community          1291.750
Brazil                      1143.600
RSA                         1002.310
Czech Republic               707.720
Bahrain                      548.400
Saudi Arabia                 131.170
Name: sales, dtype: float64
```

[226]:
```python
df_copy= df.groupby(by=['Country'])["sales"].sum().sort_values(ascending=False).
  ↪reset_index()[:10]
sns.set_style("whitegrid")
plt.subplots(figsize=(13,8))
sns.barplot(x= df_copy["Country"], y= df_copy["sales"])
#plt.bar(df_copy["Country"], df_copy["sales"],color='red',width=0.4)
plt.xlabel("Countries", weight="bold")
plt.ylabel("Sales", weight="bold")
plt.grid(alpha=0.5, axis="y")
```
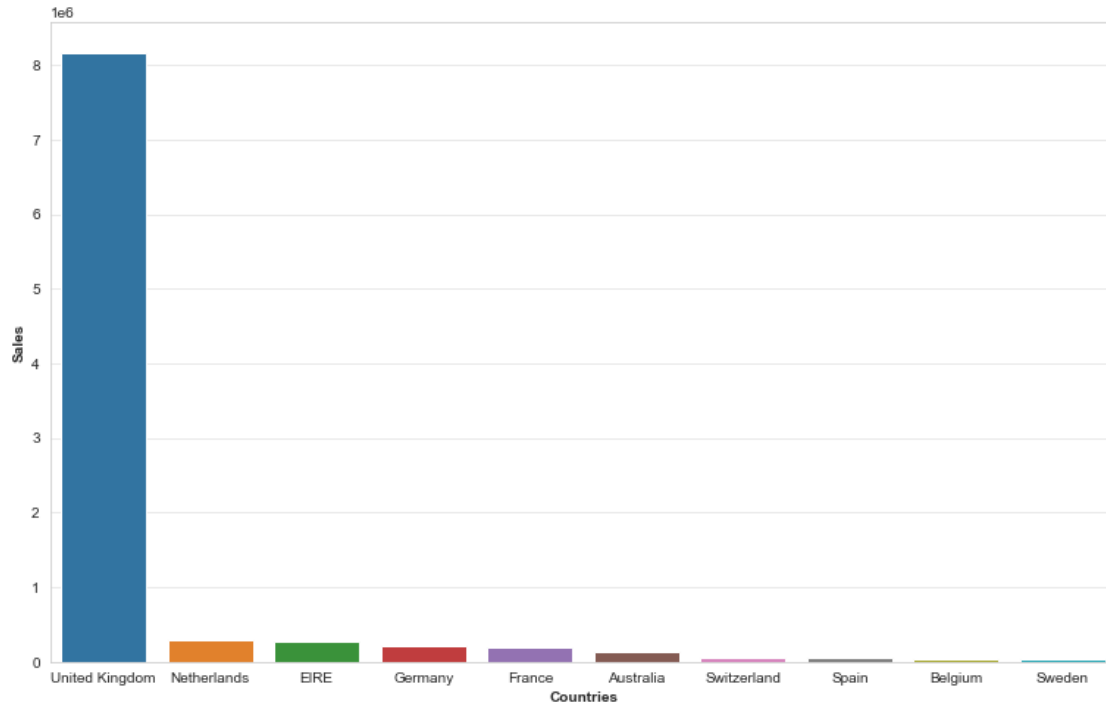
United Kingdom has the largest sales among all the countries then Netherlands, BRE and Germany

4. Which month has the most sales?

```
[227]: df.head()
```

```
[227]:   InvoiceNo StockCode                          Description  Quantity  \
      0    536365    85123A   WHITE HANGING HEART T-LIGHT HOLDER         6
      1    536365     71053                  WHITE METAL LANTERN         6
      2    536365    84406B        CREAM CUPID HEARTS COAT HANGER         8
      3    536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE         6
      4    536365    84029E         RED WOOLLY HOTTIE WHITE HEART.         6

                InvoiceDate  UnitPrice  CustomerID         Country  year  month  \
      0 2010-12-01 08:26:00       2.55       17850  United Kingdom  2010     12
      1 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
      2 2010-12-01 08:26:00       2.75       17850  United Kingdom  2010     12
      3 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
      4 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12

         day  weekday  dayofweek  sales
      0    1        2  Wednesday  15.30
      1    1        2  Wednesday  20.34
      2    1        2  Wednesday  22.00
      3    1        2  Wednesday  20.34
```

40

```
4        1        2  Wednesday  20.34
```

[228]:
```python
df.groupby(by=['month']).sum()['sales'].sort_values(ascending=False)
```

[228]:
```
month
11    1456145.800
12    1179424.670
10    1069368.230
9     1017596.682
5      722094.100
6      689977.230
3      682013.980
8      681386.460
7      680156.991
1      558448.560
2      497026.410
4      492367.841
Name: sales, dtype: float64
```

[229]:
```python
df.groupby(by=['month']).sum()['sales'].plot(kind='line',figsize=(12,8))
plt.title('Total Sales for each month', weight= "bold")
plt.ylabel('Total no. of sales', weight= "bold")
plt.xlabel('Month', weight= "bold")
#plt.xticks(rotation=50)
plt.show()
```
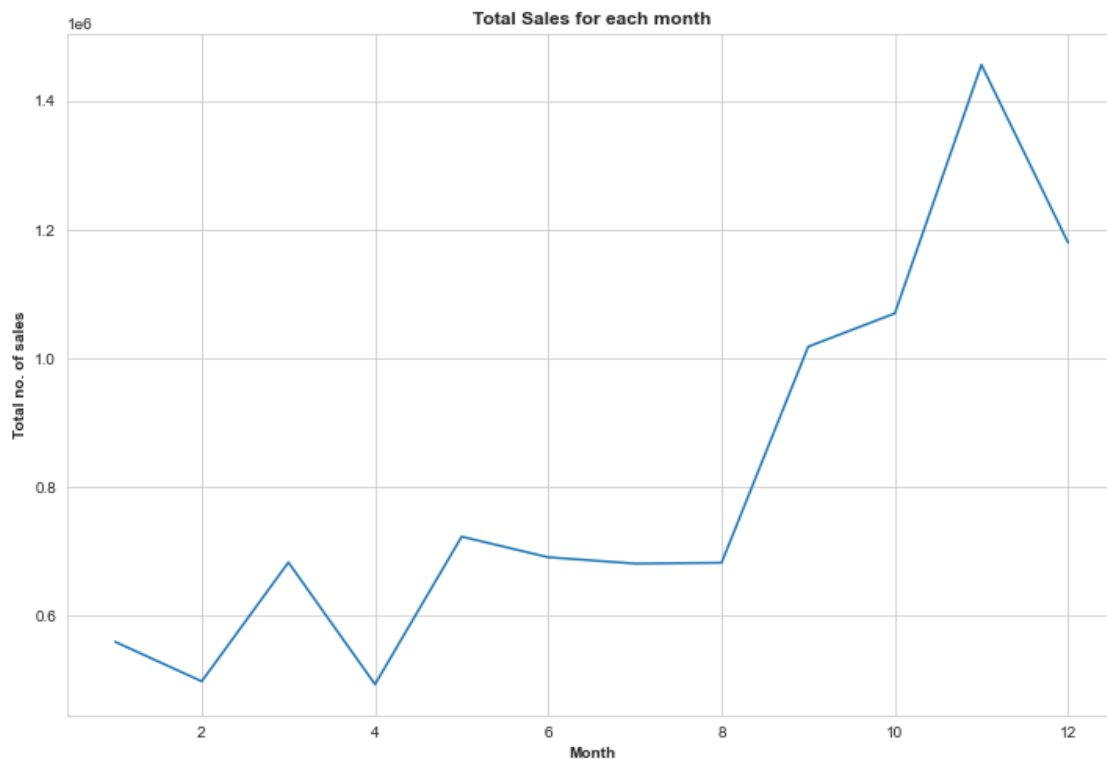
11th month has the highest sales and 4th month has the lowest sales.

5. Which day has the most sales?

```
[230]: df.groupby(by=['dayofweek']).sum()['sales'].sort_values(ascending=False)
```

```
[230]: dayofweek
       Thursday      2108701.530
       Tuesday       1965703.611
       Wednesday     1730088.430
       Monday        1584895.301
       Friday        1537958.621
       Sunday         798659.461
       Name: sales, dtype: float64
```

```
[231]: df.groupby(by=['dayofweek']).sum()['sales'].sort_values(ascending=False).
        ↪plot(kind= "line", figsize=(12,8))
       plt.title('Sales according to days of the week', weight= "bold")
       plt.ylabel('Total no. of sales', weight= "bold")
       plt.xlabel('Days of the Week', weight= "bold")
       #plt.xticks(rotation=50)
       plt.show()
```
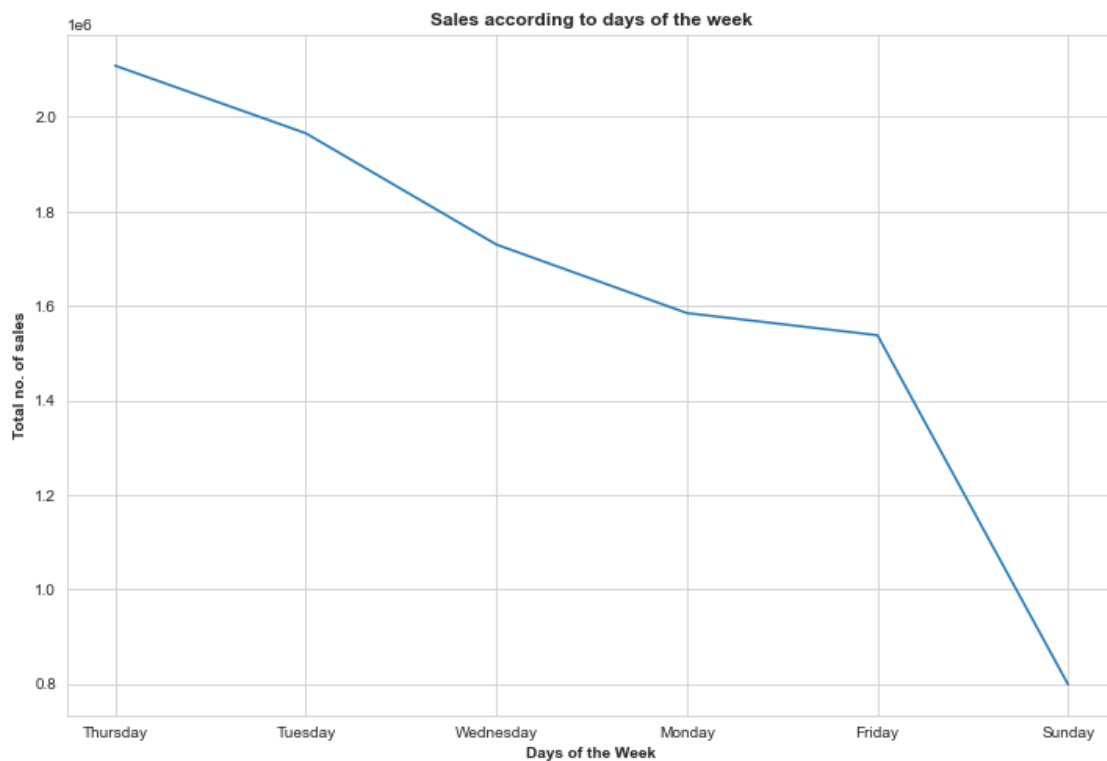
Thursday has the highest sales and Sunday has the lowest sales.

6. Top 10 most purchased item.

```
[232]: df.head()
```

```
[232]:    InvoiceNo StockCode                       Description  Quantity  \
       0     536365    85123A  WHITE HANGING HEART T-LIGHT HOLDER         6
       1     536365     71053                 WHITE METAL LANTERN         6
       2     536365    84406B      CREAM CUPID HEARTS COAT HANGER         8
       3     536365    84029G  KNITTED UNION FLAG HOT WATER BOTTLE        6
       4     536365    84029E       RED WOOLLY HOTTIE WHITE HEART.        6

                  InvoiceDate  UnitPrice  CustomerID         Country  year  month  \
       0 2010-12-01 08:26:00       2.55       17850  United Kingdom  2010     12
       1 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
       2 2010-12-01 08:26:00       2.75       17850  United Kingdom  2010     12
       3 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12
       4 2010-12-01 08:26:00       3.39       17850  United Kingdom  2010     12

          day  weekday  dayofweek  sales
       0    1        2  Wednesday  15.30
       1    1        2  Wednesday  20.34
       2    1        2  Wednesday  22.00
       3    1        2  Wednesday  20.34
       4    1        2  Wednesday  20.34
```

```
[233]: df.groupby(by=['Description']).sum()['sales'].sort_values(ascending=False)[:10].
       ↪plot(kind= "bar", figsize=(12,8))
       plt.title('10 most purchased items', weight= "bold")
       plt.ylabel('Items', weight= "bold")
       plt.xlabel('Sales', weight= "bold")
       #plt.xticks(rotation=50)
       plt.show()
```

10 most purchased items
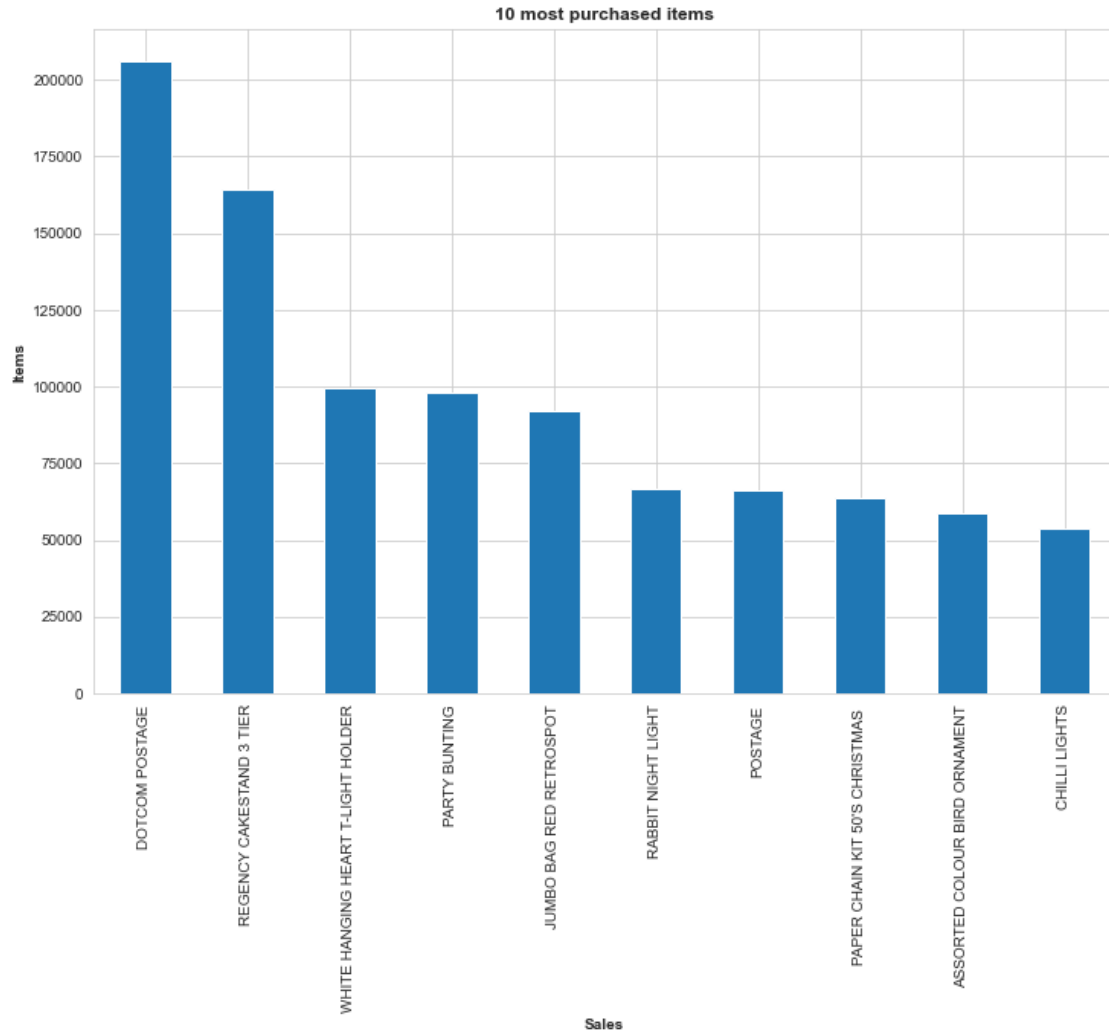
DOTCOM POSTAGE has the highest sales