this is for analysis of titles for harvard library dataset

In [1]:
```
#load in data from data_cleaned.csv

import pandas as pd
data = pd.read_csv('data_cleaned.csv')
```

In [2]:
```
#load wordcloud, nltk, etc
import numpy as np
import os
from wordcloud import WordCloud
import matplotlib.pyplot as plt
import nltk
from nltk.corpus import stopwords
nltk.download('stopwords')
nltk.download('punkt')
from nltk.tokenize import word_tokenize
import re

stop_words = set(stopwords.words('english'))
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     /Users/rekaforgo/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
[nltk_data] Downloading package punkt to /Users/rekaforgo/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```

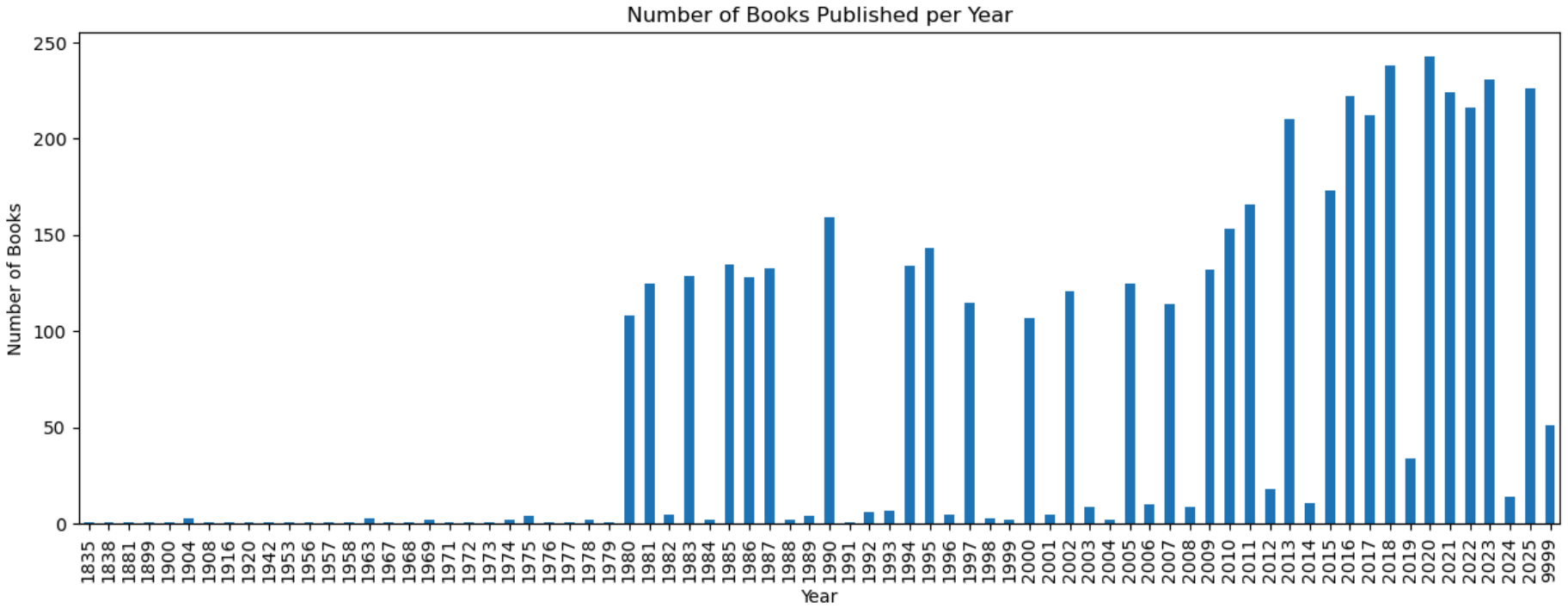
In [3]:
```
data.head()
```

Out[3]:

	X	title	subtitle	author	publication_date	language	genre	resource_type	creation_date
0	0	Painting is a supreme fiction	writings by Jesse Murry, 1980-1993	[['Murry, Jesse'], ['Earnest, Jarrett'], ['Als...	2021	English	['text', 'still image']	text	2021
1	1	Beat the story-drum, pum-pum	NaN	[['Bryan, Ashley'], ['Ahern, M. M.'], ['Athene...	1980	English	['text', 'still image', 'fairy tales.', 'Fairy...	text	1980
2	2	preparation of the novel	lecture courses and seminars at the Collège de...	[['Barthes, Roland'], ['Briggs, Kate'], ['Lég...	2011	English	bibliography	text	2010
3	3	Information through the printed word	NaN	[['Machlup, Fritz'], ['Leeson, Kenneth'], ['Le...	1980	English	bibliography	text	1978
4	4	green book	NaN	Qaddafi, Muammar	1980	English	government publication	text	1981

In [4]:
```
#filter for english language only
data_en = data[data['language'] == 'English']

#convert publication_date to integer + remove rows with non-integer publication_date
data_en = data_en[pd.to_numeric(data_en['publication_date'], errors='coerce').notnull()]

data_en.head()

#count number of books per year
books_per_year = data_en['publication_date'].value_counts().sort_index()
books_per_year.plot(kind='bar', figsize=(15,5), title='Number of Books Published per Year')
plt.xlabel('Year')
plt.ylabel('Number of Books')
plt.show()

#remove below 80 books per year
```

```
years_to_keep = books_per_year[books_per_year >= 80].index.astype(int)
data_en = data_en[data_en['publication_date'].astype(int).isin(years_to_keep)]
```



In [5]:
```
# create a list of titles per year from 1980 - 2024
titles_by_year = {}

for year in range(1980, 2025):
    titles = data_en[data_en['publication_date'].astype(int) == year]['title'].tolist()
    titles_by_year[year] = ' '.join(titles)

#print(titles_by_year[1980])  # Example output for year 1980
```

In [6]:
```
#expand stopwords by adding some
additional_stopwords = {'book', 'edition', 'volume', 'series', 's', "books"}

stop_words = set(stopwords.words('english')).union(additional_stopwords)
```

In [7]:
```
#generate tokens and remove stopwords

def preprocess_text(text):
    text = text.lower()
    text = re.sub(r"['']", "", text)
    text = re.sub(r"[^a-z\s]", " ", text)
    tokens = word_tokenize(text)

    # filter stopwords + remove single-character tokens
    tokens = [
        t for t in tokens
        if t not in stop_words and len(t) > 1
    ]

    return " ".join(tokens)



filtered_titles_by_year = {year: preprocess_text(titles) for year, titles in titles_by_year.items()}


#print(filtered_titles_by_year[1980])  # Example output for year 1980
```

In [ ]:
```
#print wordcloud for each year
#skip if na

os.makedirs("wordclouds", exist_ok=True)

for year, text in filtered_titles_by_year.items():
    if not text:
        continue
    wordcloud = WordCloud(width=800, height=400, background_color='white',
                          max_words=100, colormap='viridis', margin=5).generate(text)

    plt.figure(figsize=(10, 5))
    plt.imshow(wordcloud, interpolation='bilinear')
    plt.axis('off')
    plt.title(f'Word Cloud for Titles in {year}')
    plt.savefig(f"wordclouds/wordcloud_{year}.png", bbox_inches='tight')
```

```
    #plt.show()
    plt.close()
```