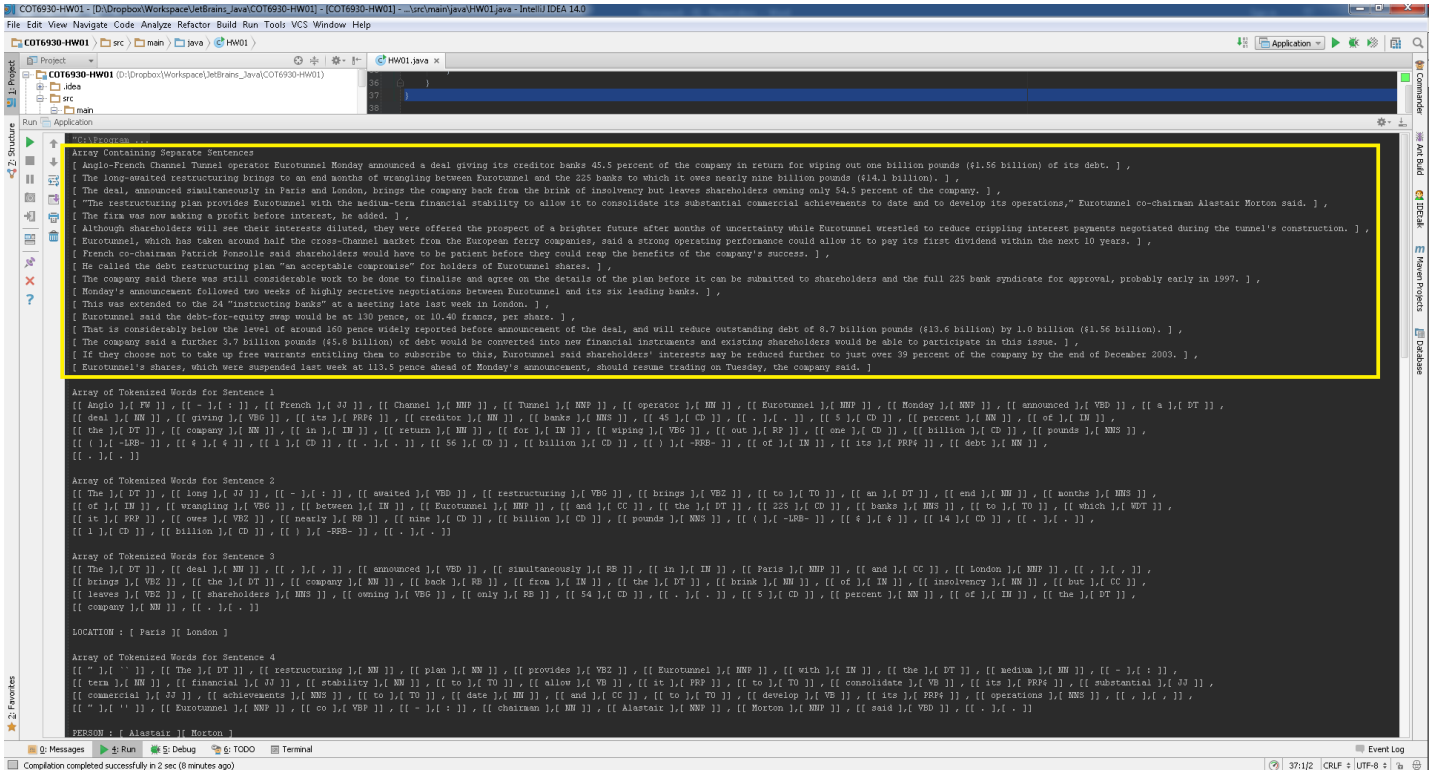
Maciej Medyk – COT6930 – Natural Language Processing – Homework 01

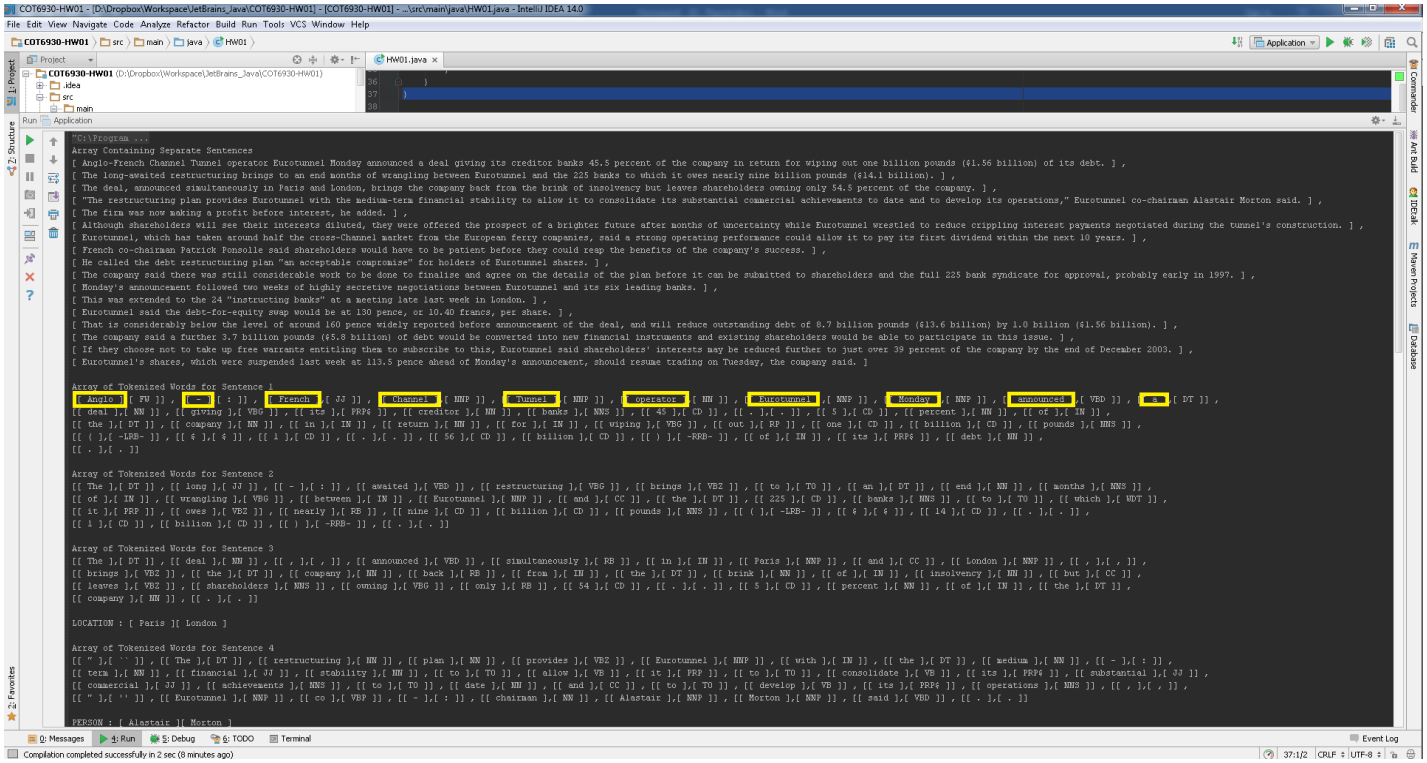
Question 1 – [2.00pt] – Detect sentences in the given news article

Loaded the article text from the file that was supplied and used Sentence Detector to divide one string to array of strings.



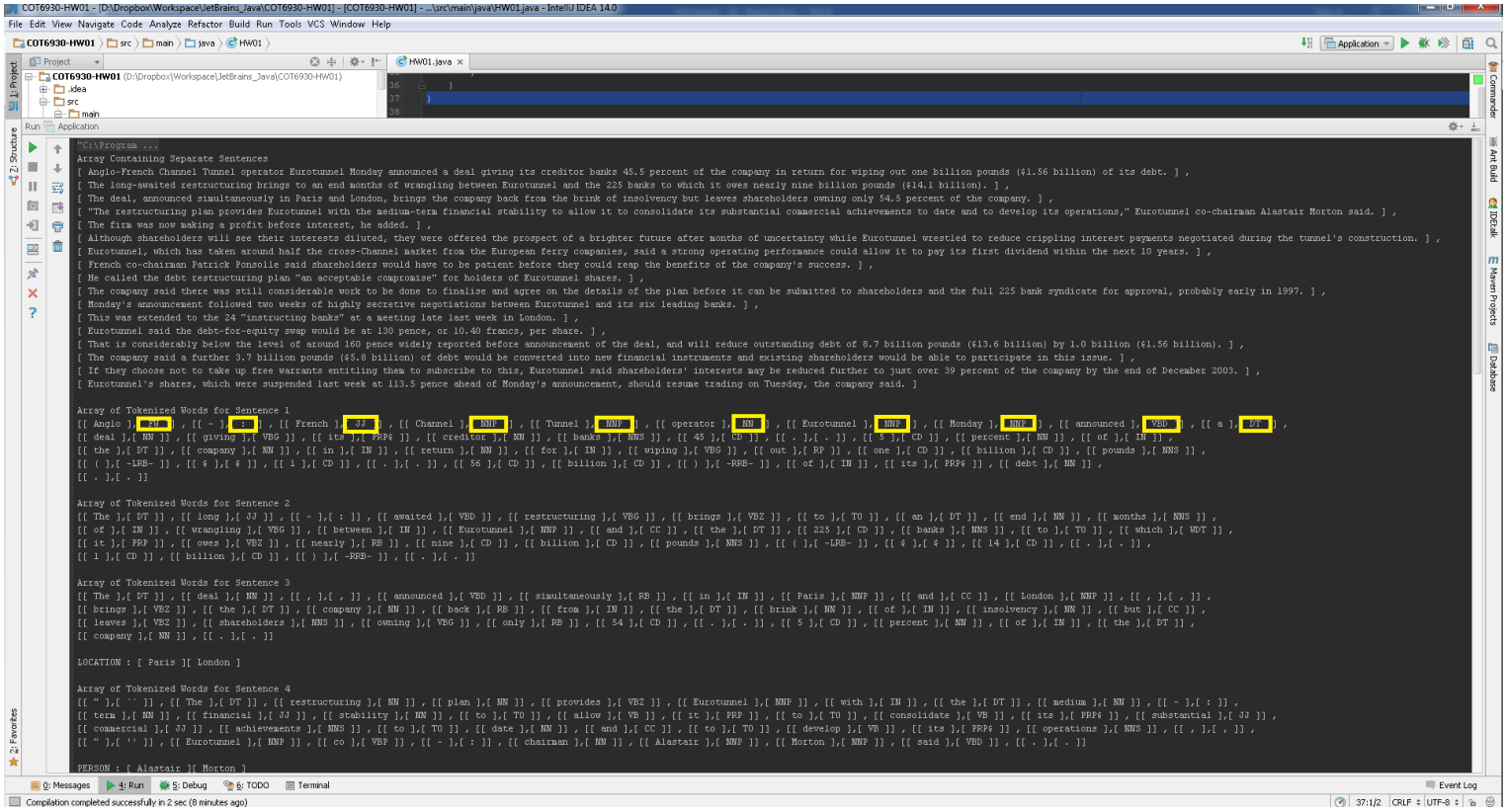
Question 2 – [2.00pt] – Tokenize each sentence into words

For each sentence, I used Word Tokenizer and displayed it for each sentence with associated POS.



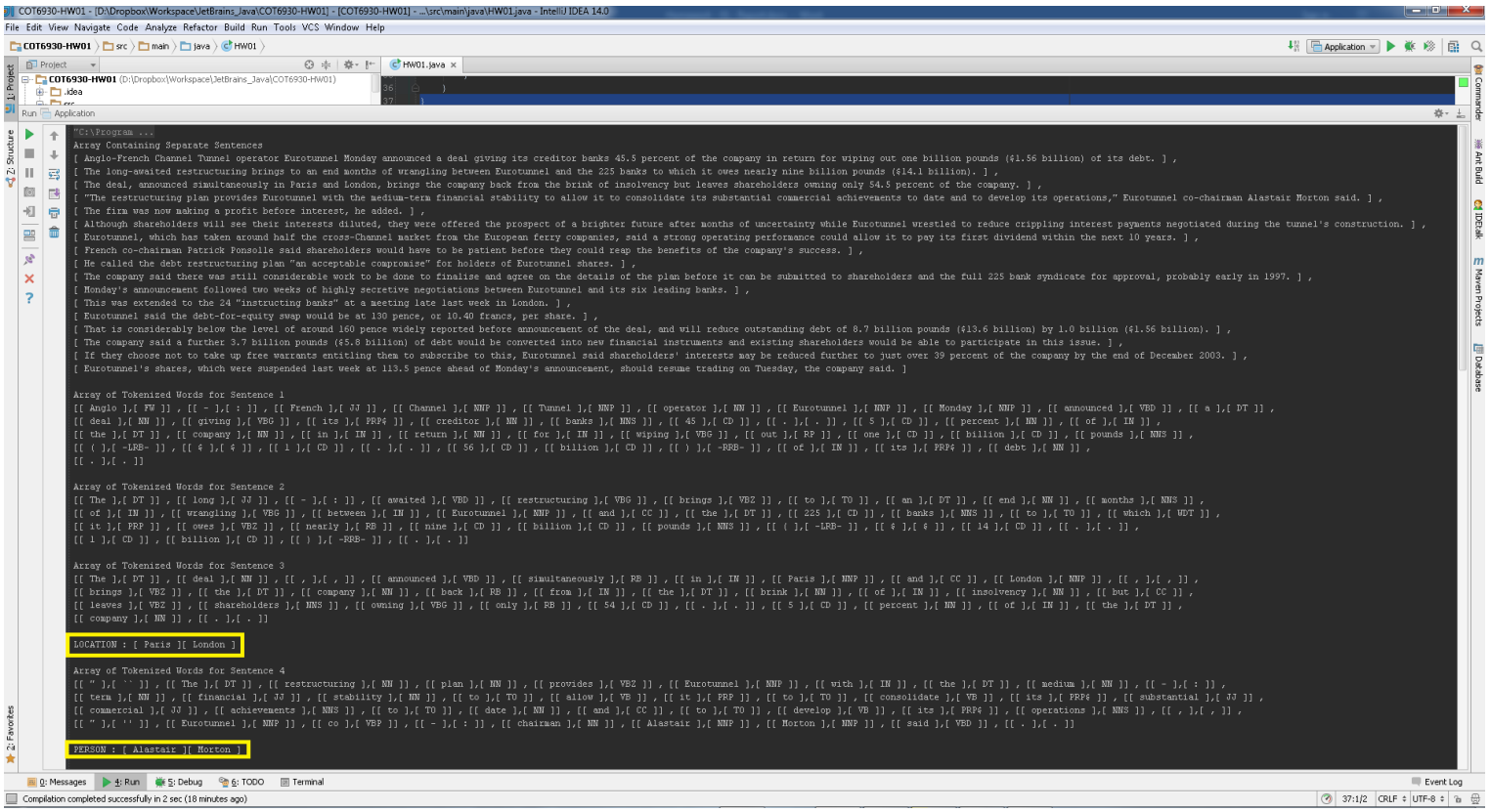
Question 3 – [3.00pt] – Perform Part-of-Speech (POS) on each sentence

For each sentence, I used Part of Speech analyzer and displayed it for each sentence with associated word. Below you see an array of arrays which display [[tokenized word],[pos tag]] , [[tokenized word],[pos tag]] , [[tokenized word],[pos tag]]



Question 4 – [3.00pt] – Find name entities including person's name entities and locations

For each sentence, I also used Person and Location named entity analyzer that marked analyzed words into spans.



Addendum – Full program code

Full program is available for download at
https://www.dropbox.com/s/avn8nv1vbhht5yg/Homework%20-%2001%20-%20Code.zip?dl=0

HW01.java

```
import opennlp.tools.util.Span;

public class HW01 {

    public static void main(String[] args) throws Exception {

        Printer print = new Printer();
        String context = new FileLoader().readFile("newsArticle.txt");

        DetectSentences detectSentences = new DetectSentences();
        String[] sentences = detectSentences.detect(context);
        System.out.println("Array Containing Separate Sentences\n" + print.printSentences(sentences) + "\n");

        for(int index = 0; index < sentences.length; index++){
            DetectTokenizableWords tokenizedWords = new DetectTokenizableWords();
            String[] tokenizedSentence = tokenizedWords.tokenize(sentences[index]);

            DetectPartOfSpeech partOfSpeech = new DetectPartOfSpeech();
            String[] partOfSpeechText = partOfSpeech.partOfSpeech(tokenizedSentence);

            DetectNamedEntities detectNamedEntities = new DetectNamedEntities();
            Span[] persons = detectNamedEntities.detectPersons(tokenizedSentence);
            Span[] locations = detectNamedEntities.detectLocations(tokenizedSentence);

            System.out.println("Array of Tokenized Words for Sentence " +  (index + 1) + "\n" +
print.printWords(tokenizedSentence, partOfSpeechText) + "\n");
            if(persons.length > 0 || locations.length > 0){
                if(persons.length > 0) {
                    System.out.println(print.printSpan(persons, tokenizedSentence));
                }
                if(locations.length > 0) {
                    System.out.println(print.printSpan(locations,tokenizedSentence));
                }
                System.out.print("\n");
            }
        }
    }
}
```

FileLoader.java

```
import java.io.BufferedReader;
import java.io.File;
import java.io.FileReader;

public class FileLoader {

    private String fileContent;

    public FileLoader() {
        fileContent = "";
    }

    public String readFile(String fileName) {

        ClassLoader classLoader = getClass().getClassLoader();
        try(BufferedReader br = new BufferedReader(new FileReader(new
File(classLoader.getResource(fileName).getFile())))) {
            for(String textLine; (textLine = br.readLine()) != null; ) {
                fileContent += textLine + " ";
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
        return fileContent;
      }
}
```

DetectSentences.java

```
import opennlp.tools.sentdetect.SentenceDetector;
import opennlp.tools.sentdetect.SentenceDetectorME;
import opennlp.tools.sentdetect.SentenceModel;
import java.io.File;
import java.io.FileInputStream;
import java.io.InputStream;

public class DetectSentences  {

    public String[] detect(String fileContext) throws Exception {

        ClassLoader classLoader = getClass().getClassLoader();
        InputStream inputStream = new FileInputStream(new File(classLoader.getResource("en-sent.bin").getFile()));
        SentenceModel model = new SentenceModel(inputStream);
        SentenceDetector detector = new SentenceDetectorME(model);
        return detector.sentDetect(fileContext);
    }
}
```

DetectTokanizableWords.java

```
import opennlp.tools.tokenize.SimpleTokenizer;

public class DetectTokenizableWords {

    public String[] tokenize(String fileContext) {
        SimpleTokenizer simpleTokenizer = SimpleTokenizer.INSTANCE;
        return simpleTokenizer.tokenize(fileContext);
    }
}
```

DetectPartOfSpeech.java

```
import opennlp.tools.postag.POSModel;
import opennlp.tools.postag.POSTaggerME;
import java.io.File;
import java.io.FileInputStream;
import java.io.InputStream;

public class DetectPartOfSpeech {

    public String[] partOfSpeech(String[] context) throws Exception {
        ClassLoader classLoader = getClass().getClassLoader();
        InputStream inputStream = new FileInputStream(new File(classLoader.getResource("en-pos-
maxent.bin").getFile()));
        POSModel model = new POSModel(inputStream);
        POSTaggerME tagger = new POSTaggerME(model);
        return tagger.tag(context);
    }
}
```

DetectNamedEntities.java

```
import opennlp.tools.namefind.NameFinderME;
import opennlp.tools.namefind.TokenNameFinderModel;
import opennlp.tools.util.Span;
import java.io.File;
import java.io.FileInputStream;
import java.io.InputStream;

public class DetectNamedEntities {

    public Span[] detectPersons(String[] context) throws Exception {
        ClassLoader classLoader = getClass().getClassLoader();
        InputStream inputStream = new FileInputStream(new File(classLoader.getResource("en-ner-
person.bin").getFile()));
        TokenNameFinderModel model = new TokenNameFinderModel(inputStream);
        NameFinderME finder = new NameFinderME(model);
        return finder.find(context);
    }

    public Span[] detectLocations(String[] context) throws Exception {
        ClassLoader classLoader = getClass().getClassLoader();
        InputStream inputStream = new FileInputStream(new File(classLoader.getResource("en-ner-
location.bin").getFile()));
        TokenNameFinderModel model = new TokenNameFinderModel(inputStream);
        NameFinderME finder = new NameFinderME(model);
        return finder.find(context);
    }
}
```

Printer.java

```java
import opennlp.tools.util.Span;

public class Printer {

    public String printSentences(String[] context) {
        String result = "";
        for (int index = 0; index < context.length; index++) {
            result += "[ " + context[index] + " ] , \n";
        }
        result = result.substring(0, result.length() - 3);
        return result;
    }

    public String printWords(String[] contextTokens, String[] contextPOS) {
        String result = "";
        for (int index = 0; index < contextTokens.length; index++) {
            result += "[[ " + contextTokens[index] + " ],";
            result += "[ " + contextPOS[index] + " ]] , ";
            if(index % 10 == 9) {
                result += "\n";
            }
        }
        result = result.substring(0, result.length() - 3);
        return result;
    }

    public String printSpan(Span[] span, String[] context) {
        String result = "";
        result += span[0].getType().toUpperCase() + " : ";
        for(int index = 0; index < span.length; index++){
            int start = span[index].getStart();
            int end = span[index].getEnd();
            for(int spanIndex = start; spanIndex < end; spanIndex++){
                result += "[ " + context[spanIndex] + " ]";
            }
        }
        return result;
    }
}
```

Addendum – Full program output

```
Array Containing Separate Sentences
[ Anglo-French Channel Tunnel operator Eurotunnel Monday announced a deal giving its creditor banks 45.5 percent of the company in return for wiping out one billion pounds ($1.56 billion) of its debt. ] ,
[ The long-awaited restructuring brings to an end months of wrangling between Eurotunnel and the 225 banks to which it owes nearly nine billion pounds ($14.1 billion). ] ,
[ The deal, announced simultaneously in Paris and London, brings the company back from the brink of insolvency but leaves shareholders owning only 54.5 percent of the company. ] ,
[ "The restructuring plan provides Eurotunnel with the medium-term financial stability to allow it to consolidate its substantial commercial achievements to date and to develop its operations," Eurotunnel co-chairman Alastair Morton said. ] ,
[ The firm was now making a profit before interest, he added. ] ,
[ Although shareholders will see their interests diluted, they were offered the prospect of a brighter future after months of uncertainty while Eurotunnel wrestled to reduce crippling interest payments negotiated during the tunnel's construction. ] ,
[ Eurotunnel, which has taken around half the cross-Channel market from the European ferry companies, said a strong operating performance could allow it to pay its first dividend within the next 10 years. ] ,
[ French co-chairman Patrick Ponsolle said shareholders would have to be patient before they could reap the benefits of the company's success. ] ,
[ He called the debt restructuring plan "an acceptable compromise" for holders of Eurotunnel shares. ] ,
[ The company said there was still considerable work to be done to finalise and agree on the details of the plan before it can be submitted to shareholders and the full 225 bank syndicate for approval, probably early in 1997. ] ,
[ Monday's announcement followed two weeks of highly secretive negotiations between Eurotunnel and its six leading banks. ] ,
[ This was extended to the 24 "instructing banks" at a meeting late last week in London. ] ,
[ Eurotunnel said the debt-for-equity swap would be at 130 pence, or 10.40 francs, per share. ] ,
[ That is considerably below the level of around 160 pence widely reported before announcement of the deal, and will reduce outstanding debt of 8.7 billion pounds ($13.6 billion) by 1.0 billion ($1.56 billion). ] ,
[ The company said a further 3.7 billion pounds ($5.8 billion) of debt would be converted into new financial instruments and existing shareholders would be able to participate in this issue. ] ,
[ If they choose not to take up free warrants entitling them to subscribe to this, Eurotunnel said shareholders' interests may be reduced further to just over 39 percent of the company by the end of December 2003. ] ,
[ Eurotunnel's shares, which were suspended last week at 113.5 pence ahead of Monday's announcement, should resume trading on Tuesday, the company said. ]

Array of Tokenized Words for Sentence 1
[[ Anglo ],[ FW ]] , [[ - ],[ : ]] , [[ French ],[ JJ ]] , [[ Channel ],[ NNP ]] , [[ Tunnel ],[ NNP ]] , [[ operator ],[ NN ]] , [[ Eurotunnel ],[ NNP ]] ,
[[ Monday ],[ NNP ]] , [[ announced ],[ VBD ]] , [[ a ],[ DT ]] ,
[[ deal ],[ NN ]] , [[ giving ],[ VBG ]] , [[ its ],[ PRP$ ]] , [[ creditor ],[ NN ]] , [[ banks ],[ NNS ]] , [[ 45 ],[ CD ]] , [[ . ],[ . ]] , [[ 5 ],[ CD ]] , [[ percent ],[ NN ]] , [[ of ],[ IN ]] ,
[[ the ],[ DT ]] , [[ company ],[ NN ]] , [[ in ],[ IN ]] , [[ return ],[ NN ]] , [[ for ],[ IN ]] , [[ wiping ],[ VBG ]] , [[ out ],[ RP ]] , [[ one ],[ CD ]] , [[ billion ],[ CD ]] , [[ pounds ],[ NNS ]] ,
[[ ( ],[ -LRB- ]] , [[ $ ],[ $ ]] , [[ 1 ],[ CD ]] , [[ . ],[ . ]] , [[ 56 ],[ CD ]] , [[ billion ],[ CD ]] , [[ ) ],[ -RRB- ]] , [[ of ],[ IN ]] , [[ its ],[ PRP$ ]] , [[ debt ],[ NN ]] ,
[[ . ],[ . ]]

Array of Tokenized Words for Sentence 2
[[ The ],[ DT ]] , [[ long ],[ JJ ]] , [[ - ],[ : ]] , [[ awaited ],[ VBD ]] , [[ restructuring ],[ VBG ]] , [[ brings ],[ VBZ ]] , [[ to ],[ TO ]] , [[ an ],[ DT ]] , [[ end ],[ NN ]] , [[ months ],[ NNS ]] ,
[[ of ],[ IN ]] , [[ wrangling ],[ VBG ]] , [[ between ],[ IN ]] , [[ Eurotunnel ],[ NNP ]] , [[ and ],[ CC ]] , [[ the ],[ DT ]] , [[ 225 ],[ CD ]] , [[ banks ],[ NNS ]] , [[ to ],[ TO ]] , [[ which ],[ WDT ]] ,
[[ it ],[ PRP ]] , [[ owes ],[ VBZ ]] , [[ nearly ],[ RB ]] , [[ nine ],[ CD ]] , [[ billion ],[ CD ]] , [[ pounds ],[ NNS ]] , [[ ( ],[ -LRB- ]] , [[ $ ],[
```

$]] , [[14],[CD]] , [[.],[.]] ,
[[1],[CD]] , [[billion],[CD]] , [[ )],[-RRB-]] , [[.],[.]]

Array of Tokenized Words for Sentence 3
[[The],[DT]] , [[deal],[NN]] , [[,],[,]] , [[announced],[VBD]] , [[simultaneously],[RB]] , [[in],[IN]] , [[Paris],[NNP]] , [[and],[CC]] , [[London],[NNP]] , [[,],[,]] ,
[[brings],[VBZ]] , [[the],[DT]] , [[company],[NN]] , [[back],[RB]] , [[from],[IN]] , [[the],[DT]] , [[brink],[NN]] , [[of],[IN]] , [[insolvency],[NN]] , [[but],[CC]] ,
[[leaves],[VBZ]] , [[shareholders],[NNS]] , [[owning],[VBG]] , [[only],[RB]] , [[54],[CD]] , [[.],[.]] , [[5],[CD]] , [[percent],[NN]] , [[of],[IN]] , [[the],[DT]] ,
[[company],[NN]] , [[.],[.]]

LOCATION : [Paris][London]

Array of Tokenized Words for Sentence 4
[["],[``]] , [[The],[DT]] , [[restructuring],[NN]] , [[plan],[NN]] , [[provides],[VBZ]] , [[Eurotunnel],[NNP]] , [[with],[IN]] , [[the],[DT]] , [[medium],[NN]] , [[-],[:]] ,
[[term],[NN]] , [[financial],[JJ]] , [[stability],[NN]] , [[to],[TO]] , [[allow],[VB]] , [[it],[PRP]] , [[to],[TO]] , [[consolidate],[VB]] , [[its],[PRP$]] , [[substantial],[JJ]] ,
[[commercial],[JJ]] , [[achievements],[NNS]] , [[to],[TO]] , [[date],[NN]] , [[and],[CC]] , [[to],[TO]] , [[develop],[VB]] , [[its],[PRP$]] , [[operations],[NNS]] , [[,],[,]] ,
[["],['']] , [[Eurotunnel],[NNP]] , [[co],[VBP]] , [[-],[:]] , [[chairman],[NN]] , [[Alastair],[NNP]] , [[Morton],[NNP]] , [[said],[VBD]] , [[.],[.]]

PERSON : [Alastair][Morton]

Array of Tokenized Words for Sentence 5
[[The],[DT]] , [[firm],[NN]] , [[was],[VBD]] , [[now],[RB]] , [[making],[VBG]] , [[a],[DT]] , [[profit],[NN]] , [[before],[IN]] , [[interest],[NN]] , [[,],[,]] ,
[[he],[PRP]] , [[added],[VBD]] , [[.],[.]]

Array of Tokenized Words for Sentence 6
[[Although],[IN]] , [[shareholders],[NNS]] , [[will],[MD]] , [[see],[VB]] , [[their],[PRP$]] , [[interests],[NNS]] , [[diluted],[VBN]] , [[,],[,]] , [[they],[PRP]] , [[were],[VBD]] ,
[[offered],[VBN]] , [[the],[DT]] , [[prospect],[NN]] , [[of],[IN]] , [[a],[DT]] , [[brighter],[JJR]] , [[future],[NN]] , [[after],[IN]] , [[months],[NNS]] , [[of],[IN]] ,
[[uncertainty],[NN]] , [[while],[IN]] , [[Eurotunnel],[NNP]] , [[wrestled],[VBD]] , [[to],[TO]] , [[reduce],[VB]] , [[crippling],[JJ]] , [[interest],[NN]] , [[payments],[NNS]] , [[negotiated],[VBD]] ,
[[during],[IN]] , [[the],[DT]] , [[tunnel],[NN]] , [['],[POS]] , [[s],[PRP]] , [[construction],[NN]] , [[.],[.]]

Array of Tokenized Words for Sentence 7
[[Eurotunnel],[NNP]] , [[,],[,]] , [[which],[WDT]] , [[has],[VBZ]] , [[taken],[VBN]] , [[around],[IN]] , [[half],[PDT]] , [[the],[DT]] , [[cross],[NN]] , [[-],[:]] ,
[[Channel],[NNP]] , [[market],[NN]] , [[from],[IN]] , [[the],[DT]] , [[European],[JJ]] , [[ferry],[NN]] , [[companies],[NNS]] , [[,],[,]] , [[said],[VBD]] , [[a],[DT]] ,
[[strong],[JJ]] , [[operating],[NN]] , [[performance],[NN]] , [[could],[MD]] , [[allow],[VB]] , [[it],[PRP]] , [[to],[TO]] , [[pay],[VB]] , [[its],[PRP$]] , [[first],[JJ]] ,
[[dividend],[NN]] , [[within],[IN]] , [[the],[DT]] , [[next],[JJ]] , [[10],[CD]] , [[years],[NNS]] , [[.],[.]]

LOCATION : [Channel]

Array of Tokenized Words for Sentence 8
[[French],[JJ]] , [[co],[NN]] , [[-],[:]] , [[chairman],[NN]] , [[Patrick],[NNP]] , [[Ponsolle],[NNP]] , [[said],[VBD]] , [[shareholders],[NNS]] , [[would],[MD]] , [[have],[VB]] ,
[[to],[TO]] , [[be],[VB]] , [[patient],[JJ]] , [[before],[IN]] , [[they],[PRP]] , [[could],[MD]] , [[reap],[VB]] , [[the],[DT]] , [[benefits],[NNS]] , [[of],[IN]] ,
[[the],[DT]] , [[company],[NN]] , [['],[POS]] , [[s],[VBZ]] , [[success],[NN]] , [[.],[.]]

PERSON : [Patrick][Ponsolle]

Array of Tokenized Words for Sentence 9
[[He],[PRP]] , [[called],[VBD]] , [[the],[DT]] , [[debt],[NN]] , [[restructuring],[NN]] , [[plan],[NN]] , [["],[``]] , [[an],[DT]] , [[acceptable],[JJ]] , [[compromise],[NN]] ,
[["],['']] , [[for],[IN]] , [[holders],[NNS]] , [[of],[IN]] , [[Eurotunnel],[NNP]] , [[shares],[NNS]] , [[.],[.]]

Array of Tokenized Words for Sentence 10
[[The],[DT]] , [[company],[NN]] , [[said],[VBD]] , [[there],[EX]] , [[was],[VBD]] , [[still],[RB]] , [[considerable],[JJ]] , [[work],[NN]] , [[to],[TO]] , [[be],[VB]] ,
[[done],[VBN]] , [[to],[TO]] , [[finalise],[VB]] , [[and],[CC]] , [[agree],[VB]] , [[on],[IN]] , [[the],[DT]] , [[details],[NNS]] , [[of],[IN]] , [[the],[DT]] ,
[[plan],[NN]] , [[before],[IN]] , [[it],[PRP]] , [[can],[MD]] , [[be],[VB]] , [[submitted],[VBN]] , [[to],[TO]] , [[shareholders],[NNS]] , [[and],[CC]] , [[the],[DT]] ,
[[full],[JJ]] , [[225],[CD]] , [[bank],[NN]] , [[syndicate],[NN]] , [[for],[IN]] , [[approval],[NN]] , [[,],[,]] , [[probably],[RB]] , [[early],[RB]] , [[in],[IN]] ,
[[1997],[CD]] , [[.],[.]]

Array of Tokenized Words for Sentence 11
[[Monday],[NNP]] , [['],[POS]] , [[s],[PRP]] , [[announcement],[NN]] , [[followed],[VBD]] , [[two],[CD]] , [[weeks],[NNS]] , [[of],[IN]] , [[highly],[RB]] , [[secretive],[JJ]] ,
[[negotiations],[NNS]] , [[between],[IN]] , [[Eurotunnel],[NNP]] , [[and],[CC]] , [[its],[PRP$]] , [[six],[CD]] , [[leading],[JJ]] , [[banks],[NNS]] , [[.],[.]]

Array of Tokenized Words for Sentence 12
[[This],[DT]] , [[was],[VBD]] , [[extended],[VBN]] , [[to],[TO]] , [[the],[DT]] , [[24],[CD]] , [["],[``]] , [[instructing],[JJ]] , [[banks],[NNS]] , [["],['']] ,
[[at],[IN]] , [[a],[DT]] , [[meeting],[NN]] , [[late],[RB]] , [[last],[JJ]] , [[week],[NN]] , [[in],[IN]] , [[London],[NNP]] , [[.],[.]]

LOCATION : [London]

Array of Tokenized Words for Sentence 13
[[Eurotunnel],[NNP]] , [[said],[VBD]] , [[the],[DT]] , [[debt],[NN]] , [[-],[:]] , [[for],[IN]] , [[-],[:]] , [[equity],[NN]] , [[swap],[NN]] , [[would],[MD]] ,
[[be],[VB]] , [[at],[IN]] , [[130],[CD]] , [[pence],[NN]] , [[,],[,]] , [[or],[CC]] , [[10],[CD]] , [[.],[.]] , [[40],[CD]] , [[francs],[NNS]] ,
[[,],[,]] , [[per],[IN]] , [[share],[NN]] , [[.],[.]]

Array of Tokenized Words for Sentence 14
[[That],[DT]] , [[is],[VBZ]] , [[considerably],[RB]] , [[below],[IN]] , [[the],[DT]] , [[level],[NN]] , [[of],[IN]] , [[around],[IN]] , [[160],[CD]] , [[pence],[NN]] ,
[[widely],[RB]] , [[reported],[VBN]] , [[before],[IN]] , [[announcement],[NN]] , [[of],[IN]] , [[the],[DT]] , [[deal],[NN]] , [[,],[,]] , [[and],[CC]] , [[will],[MD]] ,
[[reduce],[VB]] , [[outstanding],[JJ]] , [[debt],[NN]] , [[of],[IN]] , [[8],[CD]] , [[.],[.]] , [[7],[CD]] , [[billion],[CD]] , [[pounds],[NNS]] , [[( ],[-LRB-]] ,
[[$],[$]] , [[13],[CD]] , [[.],[.]] , [[6],[CD]] , [[billion],[CD]] , [[ )],[-RRB-]] , [[by],[IN]] , [[1],[CD]] , [[.],[.]] , [[0],[CD]] ,
[[billion],[CD]] , [[( ],[-LRB-]] , [[$],[$]] , [[1],[CD]] , [[.],[.]] , [[56],[CD]] , [[billion],[CD]] , [[ )],[-RRB-]] , [[.],[.]]

Array of Tokenized Words for Sentence 15

[[The],[DT]] , [[company],[NN]] , [[said],[VBD]] , [[a],[DT]] , [[further],[JJ]] , [[3],[CD]] , [[.],[.]] , [[7],[CD]] , [[billion],[CD]] , [[pounds],[NNS]] ,
[[( ],[-LRB-]] , [[$],[$]] , [[5],[CD]] , [[.],[.]] , [[8],[CD]] , [[billion],[CD]] , [[ )],[-RRB-]] , [[of],[IN]] , [[debt],[NN]] , [[would],[MD]] ,
[[be],[VB]] , [[converted],[VBN]] , [[into],[IN]] , [[new],[JJ]] , [[financial],[JJ]] , [[instruments],[NNS]] , [[and],[CC]] , [[existing],[VBG]] , [[shareholders],[NNS]] , [[would],[MD]] ,
[[be],[VB]] , [[able],[JJ]] , [[to],[TO]] , [[participate],[VB]] , [[in],[IN]] , [[this],[DT]] , [[issue],[NN]] , [[.],[.]]

Array of Tokenized Words for Sentence 16
[[If],[IN]] , [[they],[PRP]] , [[choose],[VBP]] , [[not],[RB]] , [[to],[TO]] , [[take],[VB]] , [[up],[RP]] , [[free],[JJ]] , [[warrants],[NNS]] , [[entitling],[VBG]] ,
[[them],[PRP]] , [[to],[TO]] , [[subscribe],[VB]] , [[to],[TO]] , [[this],[DT]] , [[,],[,]] , [[Eurotunnel],[NNP]] , [[said],[VBD]] , [[shareholders],[NNS]] , [['],[POS]] ,
[[interests],[NNS]] , [[may],[MD]] , [[be],[VB]] , [[reduced],[VBN]] , [[further],[RB]] , [[to],[TO]] , [[just],[RB]] , [[over],[IN]] , [[39],[CD]] , [[percent],[NN]] ,
[[of],[IN]] , [[the],[DT]] , [[company],[NN]] , [[by],[IN]] , [[the],[DT]] , [[end],[NN]] , [[of],[IN]] , [[December],[NNP]] , [[2003],[CD]] , [[.],[.]]

Array of Tokenized Words for Sentence 17
[[Eurotunnel],[NNP]] , [['],[POS]] , [[s],[PRP]] , [[shares],[NNS]] , [[,],[,]] , [[which],[WDT]] , [[were],[VBD]] , [[suspended],[VBN]] , [[last],[JJ]] , [[week],[NN]] ,
[[at],[IN]] , [[113],[CD]] , [[.],[.]] , [[5],[CD]] , [[pence],[NN]] , [[ahead],[RB]] , [[of],[IN]] , [[Monday],[NNP]] , [['],[POS]] , [[s],[PRP]] ,
[[announcement],[NN]] , [[,],[,]] , [[should],[MD]] , [[resume],[VB]] , [[trading],[VBG]] , [[on],[IN]] , [[Tuesday],[NNP]] , [[,],[,]] , [[the],[DT]] , [[company],[NN]] ,
[[said],[VBD]] , [[.],[.]]