```
In [2]:  #On importe les librairies nécessaires
         import nltk

         nltk.download ('stopwords')
         from nltk.corpus import stopwords

         nltk.download ('gutenberg')
         from nltk.corpus import gutenberg
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Unzipping corpora\stopwords.zip.
[nltk_data] Downloading package gutenberg to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Unzipping corpora\gutenberg.zip.
```

Partie A

2)

```
In [7]:  import nltk
         from nltk import sent_tokenize
         from nltk.corpus import stopwords
         import nltk
         from nltk import sent_tokenize, word_tokenize
         from nltk.corpus import stopwords
         import nltk
         nltk.download('averaged_perceptron_tagger')

         nltk.download('punkt')
         filename = 'metamorphosis_clean.txt'
         file=open(filename,'rt')
         text = file.read()
         file.close()
         sentences = sent_tokenize(text)
         words = word_tokenize(sentences[0])
         nltk.pos_tag(words)
         text_words = text.split()

         filtered_words = []
         for word in text_words:
             if word.lower() not in en_stops:
                 filtered_words.append(word)

         filtered_text = ' '.join(filtered_words)

         print(stopwords.words('english'))
         en_stops = set(stopwords.words('english'))

         print(filtered_text)
```

```
['i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "you're", "y
ou've", "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves', 'he', 'hi
m', 'his', 'himself', 'she', "she's", 'her', 'hers', 'herself', 'it', "it's", 'it
s', 'itself', 'they', 'them', 'their', 'theirs', 'themselves', 'what', 'which',
'who', 'whom', 'this', 'that', "that'll", 'these', 'those', 'am', 'is', 'are', 'w
as', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having', 'do', 'does',
'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or', 'because', 'as', 'unt
il', 'while', 'of', 'at', 'by', 'for', 'with', 'about', 'against', 'between', 'in
to', 'through', 'during', 'before', 'after', 'above', 'below', 'to', 'from', 'u
p', 'down', 'in', 'out', 'on', 'off', 'over', 'under', 'again', 'further', 'the
n', 'once', 'here', 'there', 'when', 'where', 'why', 'how', 'all', 'any', 'both',
'each', 'few', 'more', 'most', 'other', 'some', 'such', 'no', 'nor', 'not', 'onl
y', 'own', 'same', 'so', 'than', 'too', 'very', 's', 't', 'can', 'will', 'just',
'don', "don't", 'should', "should've", 'now', 'd', 'll', 'm', 'o', 're', 've',
'y', 'ain', 'aren', "aren't", 'couldn', "couldn't", 'didn', "didn't", 'doesn', "d
oesn't", 'hadn', "hadn't", 'hasn', "hasn't", 'haven', "haven't", 'isn', "isn't",
'ma', 'mightn', "mightn't", 'mustn', "mustn't", 'needn', "needn't", 'shan', "sha
n't", 'shouldn', "shouldn't", 'wasn', "wasn't", 'weren', "weren't", 'won', "wo
n't", 'wouldn', "wouldn't"]
```

One morning, Gregor Samsa woke troubled dreams, found transformed bed horrible vermin. lay armour-like back, lifted head little could see brown belly, slightly domed divided arches stiff sections. bedding hardly able cover seemed ready slide moment. many legs, pitifully thin compared size rest him, waved helplessly looked. "What's happened me?" thought. dream. room, proper human room although little small, lay peacefully four familiar walls. collection textile samples lay spread table - Samsa travelling salesman - hung picture recently cut illustrated magazine housed nice, gilded frame. showed lady fitted fur hat fur boa sat upright, raising heavy fur muff covered whole lower arm towards viewer. Gregor turned look window dull weather. Drops rain could heard hitting pane, made feel quite sad. "How sleep little bit longer forget nonsense", thought, something unable used sleeping right, present state get position. However hard threw onto right, always rolled back was. must tried hundred times, shut eyes look floundering legs, stopped began feel mild, dull pain never felt before. "Oh, God", thought, "what strenuous career I've chosen! Travelling day day out. business like takes much effort business home, top there's curse travelling, worries making train connections, bad irregular food, contact different people time never get know anyone become friendly them. go Hell!" felt slight itch belly; pushed slowly back towards headboard could lift head better; found itch was, saw covered lots little white spots know make of; tried feel place one legs drew quickly back soon touched overcome cold shudder. slid back former position. "Getting early time", thought, "it makes stupid. got get enough sleep. travelling salesmen live life luxury. instance, whenever go back guest house morning copy contract, gentlemen always still sitting eating breakfasts. ought try boss; I'd get kicked spot. knows, maybe would best thing me. parents think I'd given notice long time ago, I'd gone boss told think, tell everything would, let know feel. He'd fall right desk! funny sort business sitting desk, talking subordinates there, especially go right close boss hard hearing. Well, there's still hope; I've got money together pay parents' debt - another five six years suppose - that's definitely I'll do. That's I'll make big change. First though, I've got get up, train leaves five." looked alarm clock, ticking chest drawers. "God Heaven!" thought. half past six hands quietly moving forwards, even later half past, like quarter seven. alarm clock rung? could see bed set four o'clock been; certainly must rung. Yes, possible quietly sleep furniture-rattling noise? True, slept peacefully, probably deeply that. now? next train went seven; catch would rush like mad collection samples still packed, feel particularly fresh lively. even catch train would avoid boss's anger office assistant would see five o'clock train go, would put report Gregor's long time ago. office assistant boss's man, spineless, understanding. reported sick? would extremely strained suspicious fifteen years service Gregor never yet ill. boss would certainly come round doctor medical insurance company, accuse parents lazy son, accept doctor's recommendation make claim doctor believed no-one ever ill many workshy. what's more, would entire

ly wrong case? Gregor fact, apart excessive sleepiness sleeping long, feel comple
tely well even felt much hungrier usual. still hurriedly thinking through, unable
decide get bed, clock struck quarter seven. cautious knock door near head. "Grego
r", somebody called - mother - "it's quarter seven. want go somewhere?" gentle vo
ice! Gregor shocked heard voice answering, could hardly recognised voice before.
deep inside him, painful uncontrollable squeaking mixed it, words could made firs
t sort echo made unclear, leaving hearer unsure whether heard properly not. Grego
r wanted give full answer explain everything, circumstances contented saying: "Ye
s, mother, yes, thank-you, I'm getting now." change Gregor's voice probably could
noticed outside wooden door, mother satisfied explanation shuffled away. short co
nversation made members family aware Gregor, expectations still home, soon father
came knocking one side doors, gently, fist. "Gregor, Gregor", called, "what's wro
ng?" short called warning deepness voice: "Gregor! Gregor!" side door sister came
plaintively: "Gregor? well? need anything?" Gregor answered sides: "I'm ready, no
w", making effort remove strangeness voice enunciating carefully putting long pau
ses each, individual word. father went back breakfast, sister whispered: "Gregor,
open door, beg you." Gregor, however, thought opening door, instead congratulated
cautious habit, acquired travelling, locking doors night even home. first thing w
anted get peace without disturbed, get dressed, breakfast. would consider next, w
ell aware would bring thoughts sensible conclusions lying bed. remembered often f
elt slight pain bed, perhaps caused lying awkwardly, always turned pure imaginati
on wondered imaginings would slowly resolve today. slightest doubt change voice n
othing first sign serious cold, occupational hazard travelling salesmen. simple m
atter throw covers; blow little fell themselves. became difficult that, especiall
y exceptionally broad. would used arms hands push up; instead little legs continu
ously moving different directions, moreover unable control. wanted bend one them,
first one would stretch out; finally managed wanted leg, others seemed set free w
ould move painfully. "This something can't done bed", Gregor said himself, "so ke
ep trying it". first thing wanted get lower part body bed, never seen lower part,
could imagine looked like; turned hard move; went slowly; finally, almost frenzy,
carelessly shoved forwards force could gather, chose wrong direction, hit hard lo
wer bedpost, learned burning pain felt lower part body might well, present, sensi
tive. tried get top part body bed first, carefully turning head side. managed qui
te easily, despite breadth weight, bulk body eventually followed slowly direction
head. last got head bed fresh air occurred let fall would miracle head injured, b
ecame afraid carry pushing forward way. could knock price; better stay bed lose c
onsciousness. took much effort get back earlier, lay sighing, watching legs strug
gled even harder before, possible, could think way bringing peace order chaos. to
ld possible stay bed sensible thing would get free whatever way could whatever sa
crifice. time, though, forget remind calm consideration much better rushing despe
rate conclusions. times like would direct eyes window look clearly could, unfortu
nately, even side narrow street enveloped morning fog view little confidence chee
r offer him. "Seven o'clock, already", said clock struck again, "seven o'clock, t
here's still fog like this." lay quietly longer, breathing lightly perhaps expect
ed total stillness bring things back real natural state. said himself: "Before st
rikes quarter past seven I'll definitely got properly bed. somebody come round wo
rk ask what's happened well, open work seven o'clock." set task swinging entire l
ength body bed time. succeeded falling bed way kept head raised could probably av
oid injuring it. back seemed quite hard, probably nothing would happen falling on
to carpet. main concern loud noise bound make, even doors would probably raise co
ncern alarm. something risked. Gregor already sticking half way bed - new method
game effort, rock back forth - occurred simple everything would somebody came hel
p him. Two strong people - father maid mind - would enough; would push arms dome
back, peel away bed, bend load patient careful swang onto floor, where, hopefull
y, little legs would find use. really call help though, even apart fact doors loc
ked? Despite difficulty in, could suppress smile thought. already moved far acros
s would hard keep balance rocked hard. time ten past seven would make final decis
ion soon. ring door flat. "That'll someone work", said himself, froze still, alth
ough little legs became lively danced around. moment everything remained quiet.
"They're opening door", Gregor said himself, caught nonsensical hope. course, mai

d's firm steps went door ever opened it. Gregor needed hear visitor's first words greeting knew - chief clerk himself. Gregor one condemned work company immediately became highly suspicious slightest shortcoming? employees, every one them, louts, one faithful devoted would go mad pangs conscience get bed spend least couple hours morning company business? really enough let one trainees make enquiries - assuming enquiries even necessary - chief clerk come himself, show whole, innocent family suspicious chief clerk could trusted wisdom investigate it? thoughts made upset proper decision, swang force bed. loud thump, really loud noise. fall softened little carpet, Gregor's back also elastic thought, made sound muffled noticeable. held head carefully enough, though, hit fell; annoyed pain, turned rubbed carpet. "Something's fallen there", said chief clerk room left. Gregor tried imagine whether something sort happened today could ever happen chief clerk too; concede possible. gruff reply question, chief clerk's firm footsteps highly polished boots could heard adjoining room. room right, Gregor's sister whispered let know: "Gregor, chief clerk here." "Yes, know", said Gregor himself; without daring raise voice loud enough sister hear him. "Gregor", said father room left, "the chief clerk come round wants know leave early train. know say him. anyway, wants speak personally. please open door. I'm sure he'll good enough forgive untidiness room." chief clerk called "Good morning, Mr. Samsa". "He well", said mother chief clerk, father continued speak door. "He well, please believe me. else would Gregor missed train! lad ever thinks business. nearly makes cross way never goes evenings; he's town week stayed home every evening. sits us kitchen reads paper studies train timetables. idea relaxation working fretsaw. He's made little frame, instance, took two three evenings, amazed nice is; hanging room; see soon Gregor opens door. Anyway, I'm glad here; able get Gregor open door ourselves; he's stubborn; I'm sure well, said morning is, isn't." "I'll moment", said Gregor slowly thoughtfully, without moving would miss word conversation. "Well can't think way explaining it, Mrs. Samsa", said chief clerk, "I hope nothing serious. hand, must say people commerce ever become slightly unwell then, fortunately unfortunately like, simply overcome business considerations." "Can chief clerk come see then?", asked father impatiently, knocking door again. "No", said Gregor. room right followed painful silence; room left sister began cry. sister go join others? probably got even begun get dressed. crying? got up, let chief clerk in, danger losing job happened boss would pursue parents demands before? need worry things like yet. Gregor still slightest intention abandoning family. time lay carpet, no-one knew condition would seriously expected let chief clerk in. minor discourtesy, suitable excuse could easily found later on, something Gregor could sacked spot. seemed Gregor much sensible leave peace instead disturbing talking crying. others know happening, worried, would excuse behaviour. chief clerk raised voice, "Mr. Samsa", called him, "what wrong? barricade room, give us yes answer, causing serious unnecessary concern parents fail - mention way - fail carry business duties way quite unheard of. I'm speaking behalf parents employer, really must request clear immediate explanation. astonished, quite astonished. thought knew calm sensible person, suddenly seem showing peculiar whims. morning, employer suggest possible reason failure appear, true - money recently entrusted - came near giving word honour could right explanation. see incomprehensible stubbornness longer feel wish whatsoever intercede behalf. position secure. originally intended say private, since cause waste time good reason see parents also learn it. turnover unsatisfactory late; grant time year especially good business, recognise that; simply time year business all, Mr. Samsa, cannot allow be." "But Sir", called Gregor, beside forgetting else excitement, "I'll open immediately, moment. I'm slightly unwell, attack dizziness, able get up. I'm still bed now. I'm quite fresh now, though. I'm getting bed. moment. patient! quite easy I'd thought. I'm quite alright now, though. shocking, suddenly happen person! quite alright last night, parents know it, perhaps better me, small symptom last night already. must noticed it. know let know work! always think get illness without staying home. Please, make parents suffer! There's basis accusations making; nobody's ever said word things. Maybe read latest contracts sent in. I'll set eight o'clock train, well, hours rest given strength. need wait, sir; I'll office soon you, please good tell boss recommend him!" Gregor gushed words, hardly knowing saying, made way chest drawers - easily done, probably prac

tise already bed - tried get upright. really want open door, really want let see speak chief clerk; others insistent, curious learn would say caught sight him. shocked would longer Gregor's responsibility could rest. If, however, took everything calmly would still reason upset, hurried really could station eight o'clock. first times tried climb smooth chest drawers slid again, finally gave one last swing stood upright; lower part body serious pain longer gave attention it. let fall back nearby chair held tightly edges little legs. also calmed down, kept quiet could listen chief clerk saying. "Did understand word that?" chief clerk asked parents, "surely he's trying make fools us". "Oh, God!" called mother, already tears, "he could seriously ill we're making suffer. Grete! Grete!" cried. "Mother?" sister called side. communicated across Gregor's room. "You'll go doctor straight away. Gregor ill. Quick, get doctor. hear way Gregor spoke now?" "That voice animal", said chief clerk, calmness contrast mother's screams. "Anna! Anna!" father called kitchen entrance hall, clapping hands, "get locksmith here, now!" two girls, skirts swishing, immediately ran hall, wrenching open front door flat went. sister managed get dressed quickly? sound door banging shut again; must left open; people often homes something awful happened. Gregor, contrast, become much calmer. understand words more, although seemed clear enough him, clearer - perhaps ears become used sound. realised, though, something wrong him, ready help. first response situation confident wise, made feel better. felt drawn back among people, doctor locksmith expected great surprising achievements - although really distinguish one other. Whatever said next would crucial, so, order make voice clear possible, coughed little, taking care loudly even might well sound different way human coughs longer sure could judge himself. Meanwhile, become quiet next room. Perhaps parents sat table whispering chief clerk, perhaps pressed door listening. Gregor slowly pushed way door chair. let go threw onto door, holding upright using adhesive tips legs. rested little recover effort involved set task turning key lock mouth. seemed, unfortunately, proper teeth - he, then, grasp key? - lack teeth was, course, made strong jaw; using jaw, really able start key turning, ignoring fact must causing kind damage brown fluid came mouth, flowed key dripped onto floor. "Listen", said chief clerk next room, "he's turning key." Gregor greatly encouraged this; calling him, father mother too: "Well done, Gregor", cried, "keep it, keep hold lock!" idea excitedly following efforts, bit key strength, paying attention pain causing himself. key turned round turned around lock it, holding upright mouth, hung onto key pushed whole weight body needed. clear sound lock snapped back Gregor's sign could break concentration, regained breath said himself: "So, need locksmith all". lay head handle door open completely. open door way, already wide open could seen. first slowly turn around one double doors, carefully want fall flat back entering room. still occupied difficult movement, unable pay attention anything else, heard chief clerk exclaim loud "Oh!", sounded like soughing wind. also saw - nearest door - hand pressed open mouth slowly retreating driven steady invisible force. Gregor's mother, hair still dishevelled bed despite chief clerk's there, looked father. unfolded arms, took two steps forward towards Gregor sank onto floor skirts spread around head disappeared onto breast. father looked hostile, clenched fists wanting knock Gregor back room. looked uncertainly round living room, covered eyes hands wept powerful chest shook. Gregor go room, leant inside door still held bolted place. way half body could seen, along head leant one side peered others. Meanwhile day become much lighter; part endless, grey-black building side street - hospital - could seen quite clearly austere regular line windows piercing facade; rain still falling, throwing large, individual droplets hit ground one time. washing breakfast lay table; much because, Gregor's father, breakfast important meal day would stretch several hours sat reading number different newspapers. wall exactly opposite photograph Gregor lieutenant army, sword hand carefree smile face called forth respect uniform bearing. door entrance hall open front door flat also open could see onto landing stairs began way below. "Now, then", said Gregor, well aware one kept calm, "I'll get dressed straight away now, pack samples set off. please let leave? see", said chief clerk, "that I'm stubborn like job; commercial traveller arduous without travelling earn living. going, office? Yes? report everything accurately, then? quite possible someone temporarily unable work, that's right time remember what's achieved past consider later

on, difficulty removed, certainly work diligence concentration. well aware I'm seriously debt employer well look parents sister, I'm trapped difficult situation, work way again. Please make things harder already, take sides office. know nobody likes travellers. think earn enormous wage well soft time it. That's prejudice particular reason think better it. you, sir, better overview rest staff, fact, say confidence, better overview boss - easy businessman like make mistakes employees judge harshly should. also well aware travellers spend almost whole year away office, easily fall victim gossip chance groundless complaints, almost impossible defend sort thing, usually even hear them, arrive back home exhausted trip, that's feel harmful effects what's going without even knowing caused them. Please, go away, least first say something show grant I'm least partly right!" chief clerk turned away soon Gregor started speak, and, protruding lips, stared back trembling shoulders left. keep still moment Gregor speaking, moved steadily towards door without taking eyes him. moved gradually, secret prohibition leaving room. reached entrance hall made sudden movement, drew foot living room, rushed forward panic. hall, stretched right hand far towards stairway there, supernatural force waiting save him. Gregor realised question let chief clerk go away mood position firm put extreme danger. something parents understand well; years, become convinced job would provide Gregor entire life, besides, much worry present lost sight thought future. Gregor, though, think future. chief clerk held back, calmed down, convinced finally over; future Gregor family depended it! sister here! clever; already tears Gregor still lying peacefully back. chief clerk lover women, surely could persuade him; would close front door entrance hall talk shocked state. sister there, Gregor would job himself. without considering still familiar well could move present state, speech still might - probably would - understood, let go door; pushed opening; tried reach chief clerk landing who, ridiculously, holding banister hands; Gregor fell immediately and, little scream sought something hold onto, landed numerous little legs. Hardly happened than, first time day, began feel alright body; little legs solid ground them; pleasure, exactly told them; even making effort carry wanted go; soon believing sorrows would soon finally end. held back urge move swayed side side crouched floor. mother far away front seemed, first, quite engrossed herself, suddenly jumped arms outstretched fingers spread shouting: "Help, pity's sake, Help!" way held head suggested wanted see Gregor better, unthinking way hurrying backwards showed not; forgotten table behind breakfast things it; reached table sat quickly without knowing doing; without even seeming notice coffee pot knocked gush coffee pouring onto carpet. "Mother, mother", said Gregor gently, looking her. completely forgotten chief clerk moment, could help snapping air jaws sight flow coffee. set mother screaming anew, fled table arms father rushed towards her. Gregor, though, time spare parents now; chief clerk already reached stairs; chin banister, looked back last time. Gregor made run him; wanted sure reaching him; chief clerk must expected something, leapt several steps disappeared; shouts resounding around staircase. flight chief clerk seemed, unfortunately, put Gregor's father panic well. relatively self controlled, now, instead running chief clerk himself, least impeding Gregor ran him, Gregor's father seized chief clerk's stick right hand (the chief clerk left behind chair, along hat overcoat), picked large newspaper table left, used drive Gregor back room, stamping foot went. Gregor's appeals father help, appeals simply understood, however much humbly turned head father merely stamped foot harder. Across room, despite chilly weather, Gregor's mother pulled open window, leant far pressed hands face. strong draught air flew street towards stairway, curtains flew up, newspapers table fluttered blown onto floor. Nothing would stop Gregor's father drove back, making hissing noises like wild man. Gregor never practice moving backwards able go slowly. Gregor allowed turn round would back room straight away, afraid took time father would become impatient, threat lethal blow back head stick father's hand moment. Eventually, though, Gregor realised choice saw, disgust, quite incapable going backwards straight line; began, quickly possible frequent anxious glances father, turn round. went slowly, perhaps father able see good intentions nothing hinder him, fact used tip stick give directions distance way turn. father would stop unbearable hissing! making Gregor quite confused. nearly finished turning round, still listening hissing, made mistake turned back little way come. pleased finally head f

ront doorway, saw narrow, body broad get without difficulty. present mood, obviou
sly occur father open double doors Gregor would enough space get through. merely
fixed idea Gregor got back room quickly possible. would ever allowed Gregor time
get upright preparation getting doorway. did, making noise ever, drive Gregor for
wards harder nothing way; sounded Gregor one father behind him; pleasant experien
ce, Gregor pushed doorway without regard might happen. One side body lifted itsel
f, lay angle doorway, one flank scraped white door painfully injured, leaving vil
e brown flecks it, soon stuck fast would able move himself, little legs along one
side hung quivering air side pressed painfully ground. father gave hefty shove be
hind released held sent flying, heavily bleeding, deep room. door slammed shut st
ick, then, finally, quiet. II getting dark evening Gregor awoke deep coma-like sl
eep. would woken soon afterwards anyway even disturbed, enough sleep felt fully r
ested. impression hurried steps sound door leading front room carefully shut woke
n him. light electric street lamps shone palely onto ceiling tops furniture, belo
w, Gregor was, dark. pushed door, feeling way clumsily antennae - beginning learn
value - order see happening there. whole left side seemed like one, painfully str
etched scar, limped badly two rows legs. One legs badly injured events morning -
nearly miracle one - dragged along lifelessly. reached door realised actually dra
wn it; smell something eat. door dish filled sweetened milk little pieces white b
read floating it. pleased almost laughed, even hungrier morning, immediately dipp
ed head milk, nearly covering eyes it. soon drew head back disappointment; pain t
ender left side make difficult eat food - able eat whole body worked together snu
ffling whole - milk taste nice. Milk like normally favourite drink, sister certai
nly left that, turned, almost will, away dish crawled back centre room. crack doo
r, Gregor could see gas lit living room. father time would normally sat evening p
aper, reading loud voice Gregor's mother, sometimes sister, sound heard. Gregor's
sister would often write tell reading, maybe father lost habit recent times. quie
t around too, even though must somebody flat. "What quiet life family lead", said
Gregor himself, and, gazing darkness, felt great pride able provide life like nic
e home sister parents. now, peace wealth comfort come horrible frightening end? s
omething Gregor want think much, started move about, crawling room. long evening,
door one side room opened slightly hurriedly closed again; later door side same;
seemed someone needed enter room thought better it. Gregor went waited immediatel
y door, resolved either bring timorous visitor room way least find was; door open
ed night Gregor waited vain. previous morning doors locked everyone wanted get hi
m, now, opened one doors clearly unlocked time day, no-one came, keys sides. late
night gaslight living room put out, easy see parents sister stayed awake time, co
uld distinctly heard went away together tip-toe. clear no-one would come Gregor's
room morning; gave plenty time think undisturbed would re-arrange life. reason, t
all, empty room forced remain made feel uneasy lay flat floor, even though living
five years. Hardly aware slight feeling shame, hurried couch. pressed back littl
e, longer able lift head, nonetheless felt immediately ease regret body broad get
underneath. spent whole night there. time passed light sleep, although frequently
woke alarm hunger, time spent worries vague hopes which, however, always led conc
lusion: time must remain calm, must show patience greatest consideration family c
ould bear unpleasantness he, present condition, forced impose them. Gregor soon o
pportunity test strength decisions, early next morning, almost night ended, siste
r, nearly fully dressed, opened door front room looked anxiously in. see straight
away, notice couch - somewhere, God's sake, flown away - shocked lost control sla
mmed door shut outside. seemed regret behaviour, opened door straight away came t
ip-toe entering room someone seriously ill even stranger. Gregor pushed head forw
ard, right edge couch, watched her. Would notice left milk was, realise lack hung
er bring food suitable? would rather go hungry draw attention it, although feel t
errible urge rush forward couch, throw sister's feet beg something good eat. Howe
ver, sister noticed full dish immediately looked drops milk splashed around surpr
ise. immediately picked - using rag, bare hands - carried out. Gregor extremely c
urious would bring place, imagining wildest possibilities, never could guessed si
ster, goodness, actually bring. order test taste, brought whole selection things,
spread old newspaper. old, half-rotten vegetables; bones evening meal, covered wh
ite sauce gone hard; raisins almonds; cheese Gregor declared inedible two days be

fore; dry roll bread spread butter salt. well poured water dish, probably permane ntly set aside Gregor's use, placed beside them. Then, consideration Gregor's fee lings, knew would eat front her, hurried even turned key lock Gregor would know c ould make things comfortable liked. Gregor's little legs whirred, last could eat. What's more, injuries must already completely healed found difficulty moving. ama zed him, month earlier cut finger slightly knife, thought finger still hurt day y esterday. "Am less sensitive used be, then?", thought, already sucking greedily c heese immediately, almost compellingly, attracted much foods newspaper. Quickly o ne another, eyes watering pleasure, consumed cheese, vegetables sauce; fresh food s, hand, like all, even dragged things want eat little way away stand smell. Long finished eating lay lethargic place, sister slowly turned key lock sign withdraw. immediately startled, although half asleep, hurried back couch. needed great self -control stay even short time sister room, eating much food rounded body little c ould hardly breathe narrow space. Half suffocating, watched bulging eyes sister u nselfconsciously took broom swept left-overs, mixing food even touched could used more. quickly dropped bin, closed wooden lid, carried everything out. hardly turn ed back Gregor came couch stretched himself. Gregor received food day now, mornin g parents maid still asleep, second time everyone eaten meal midday parents would sleep little well, Gregor's sister would send maid away errand. Gregor's father m other certainly want starve either, perhaps would could stand experience feeding told it, perhaps sister wanted spare distress could indeed suffering enough. impo ssible Gregor find told doctor locksmith first morning get flat. nobody could und erstand him, nobody, even sister, thought could understand them, content hear sis ter's sighs appeals saints moved room. later, become little used everything - wa s, course, question ever becoming fully used situation - Gregor would sometimes c atch friendly comment, least comment could construed friendly. "He's enjoyed dinn er today", might say diligently cleared away food left him, left it, slowly becam e frequent, would often say, sadly, "now everything's left again". Although Grego r able hear news directly listen much said next rooms, whenever heard anyone spea king would scurry straight appropriate door press whole body it. seldom conversat ion, especially first, way, even secret. two whole days, talk every mealtime now; even meals spoke subject always least two members family home - nobody wanted hom e question leave flat entirely empty. first day maid fallen knees begged Gregor's mother let go without delay. clear much knew happened left within quarter hour, t earfully thanking Gregor's mother dismissal done enormous service. even swore emp hatically tell anyone slightest happened, even though no-one asked her. Gregor's sister also help mother cooking; although much bother no-one ate much. Gregor oft en heard one would unsuccessfully urge another eat, receive answer "no thanks, I've enough" something similar. No-one drank much either. sister would sometimes ask father whether would like beer, hoping chance go fetch herself. father said n othing would add, would feel selfish, could send housekeeper it, father would clo se matter big, loud "No", would said. Even first day come end, father explained G regor's mother sister finances prospects were. stood table took receipt document little cash box saved business collapsed five years earlier. Gregor heard opened complicated lock closed taken item wanted. heard father say first good news Grego r heard since first incarcerated room. thought nothing remained father's busines s, least never told anything different, Gregor never asked anyway. business misfo rtune reduced family state total despair, Gregor's concern time arrange things co uld forget quickly possible. started working especially hard, fiery vigour raised junior salesman travelling representative almost overnight, bringing chance earn money quite different ways. Gregor converted success work straight cash could lay table home benefit astonished delighted family. good times never come again, leas t splendour, even though Gregor later earned much position bear costs whole famil y, bear them. even got used it, Gregor family, took money gratitude glad provide it, although longer much warm affection given return. Gregor remained close siste r now. Unlike him, fond music gifted expressive violinist, secret plan send conse rvatory next year even though would cause great expense would made way. Gregor's short periods town, conversation sister would often turn conservatory ever mentio ned lovely dream could never realised. parents like hear innocent talk, Gregor th ought quite hard decided would let know planned grand announcement Christmas day.

sort totally pointless thing went mind present state, pressed upright door listening. times simply became tired continue listening, head would fall wearily door would pull start, even slightest noise caused would heard next door would go silent. "What's he's now", father would say while, clearly gone door, would interrupted conversation slowly taken again. explaining things, father repeated several times, partly long time since occupied matters partly Gregor's mother understand everything first time. repeated explanations Gregor learned, pleasure, despite misfortunes still money available old days. lot, touched meantime interest accumulated. Besides that, using money Gregor bringing home every month, keeping little himself, that, too, accumulating. Behind door, Gregor nodded enthusiasm pleasure unexpected thrift caution. could actually used surplus money reduce father's debt boss, day could freed job would come much closer, certainly better way father done things. money, however, certainly enough enable family live interest; enough maintain for, perhaps, one two years, more. That's say, money really touched set aside emergencies; money live earned. father healthy old, lacking self confidence. five years working - first holiday life full strain success - put lot weight become slow clumsy. Would Gregor's elderly mother go earn money? suffered asthma strain move home, every day would spent struggling breath sofa open window. Would sister go earn money? still child seventeen, life till enviable, consisting wearing nice clothes, sleeping late, helping business, joining modest pleasures playing violin. Whenever began talk need earn money, Gregor would always first let go door throw onto cool, leather sofa next it, became quite hot shame regret. would often lie whole night through, sleeping wink scratching leather hours end. might go effort pushing chair window, climbing onto sill and, propped chair, leaning window stare it. used feel great sense freedom this, obviously something remembered experienced, actually saw way becoming less distinct every day, even things quite near; used curse ever-present view hospital across street, could see all, known lived Charlottenstrasse, quiet street despite middle city, could thought looking window barren waste grey sky grey earth mingled inseparably. observant sister needed notice chair twice would always push back exact position window tidied room, even left inner pane window open on. Gregor able speak sister thank would easier bear it; caused pain. sister, naturally, tried far possible pretend nothing burdensome it, longer went on, course, better able so, time went Gregor also able see much better. even become unpleasant him, now, whenever entered room. sooner come would quickly close door precaution no-one would suffer view Gregor's room, would go straight window pull hurriedly open almost suffocating. Even cold, would stay window breathing deeply little while. would alarm Gregor twice day running noise making; would stay couch shivering whole while, knowing full well would certainly liked spare ordeal, impossible room windows closed. One day, month Gregor's transformation sister longer particular reason shocked appearance, came room little earlier usual found still staring window, motionless, would horrible. itself, sister's coming room would surprise Gregor would difficult immediately open window still there, come in, went straight back closed door behind her, stranger would thought threatened tried bite her. Gregor went straight hide couch, course, wait midday sister came back seemed much uneasy usual. made realise still found appearance unbearable would continue so, probably even overcome urge flee saw little bit protruded couch. One day, order spare even sight, spent four hours carrying bedsheet couch back arranged completely covered sister would able see even bent down. think sheet necessary take again, clear enough pleasure Gregor cut completely. left sheet was. Gregor even thought glimpsed look gratitude one time carefully looked sheet see sister liked new arrangement. first fourteen days, Gregor's parents could bring come room see him. would often hear say appreciated new work sister even though, before, seen girl somewhat useless frequently annoyed her. two them, father mother, would often wait outside door Gregor's room sister tidied there, soon went would tell exactly everything looked, Gregor eaten, behaved time whether, perhaps, slight improvement could seen. mother also wanted go visit Gregor relatively soon father sister first persuaded it. Gregor listened closely this, approved fully. Later, though, held back force, made call out: "Let go see Gregor, unfortunate son! Can't understand see him?", Gregor would think maybe would better mother came in, every day course, one day week, perhaps; could understand everything much

better sister who, courage, still child all, really might adult's appreciation bu
rdensome job taken on. Gregor's wish see mother soon realised. consideration pare
nts, Gregor wanted avoid seen window day, square meters floor give much room craw
l about, hard lie quietly night, food soon stopped giving pleasure all, so, enter
tain himself, got habit crawling walls ceiling. especially fond hanging ceiling;
quite different lying floor; could breathe freely; body light swing it; there, re
laxed almost happy, might happen would surprise even letting go ceiling landing f
loor crash. now, course, far better control body and, even fall great that, cause
d damage. soon sister noticed Gregor's new way entertaining - had, all, left trac
es adhesive feet crawled - got head make easy possible removing furniture got wa
y, especially chest drawers desk. Now, something would able herself; dare ask hel
p father; sixteen year old maid carried bravely since cook left certainly would h
elped this, even asked allowed keep kitchen locked times never open door unless e
specially important; sister choice choose time Gregor's father fetch mother help
her. approached room, Gregor could hear mother express joy, door went silent. Fir
st, course, sister came looked round see everything room alright; let mother ente
r. Gregor hurriedly pulled sheet lower couch put folds everything really looked t
hrown chance. Gregor also refrained, time, spying sheet; gave chance see mother l
ater simply glad come. "You come in, can't seen", said sister, obviously leading
hand. old chest drawers heavy pair feeble women heaving about, Gregor listened pu
shed place, sister always taking heaviest part work ignoring mother's warnings wo
uld strain herself. lasted long time. labouring fifteen minutes mother said would
better leave chest was, one thing heavy get job finished Gregor's father got home
leaving middle room would way even more, another thing even sure taking furniture
away would really help him. thought opposite; sight bare walls saddened right hea
rt; Gregor feel way it, he'd used furniture room long time would make feel abando
ned empty room like that. Then, quietly, almost whispering wanting Gregor (whose
whereabouts know) hear even tone voice, convinced understand words, added "and ta
king furniture away, seem like we're showing we've given hope improvement we're a
bandoning cope himself? think it'd best leave room exactly way Gregor comes back
us he'll find everything unchanged he'll able forget time easier". Hearing words
mother made Gregor realise lack direct human communication, along monotonous life
led family two months, must made confused - could think way explaining seriously
wanted room emptied out. really wanted transform room cave, warm room fitted nice
furniture inherited? would let crawl around unimpeded direction, would also let q
uickly forget past still human. come close forgetting, voice mother, unheard lon
g, shaken it. Nothing removed; everything stay; could without good influence furn
iture condition; furniture made difficult crawl mindlessly loss great advantage.
sister, unfortunately, agree; become used idea, without reason, Gregor's spokesma
n parents things concerned him. meant mother's advice sufficient reason insist re
moving chest drawers desk, thought first, furniture apart all-important couch. ch
ildish perversity, course, unexpected confidence recently acquired, made insist;
indeed noticed Gregor needed lot room crawl in, whereas furniture, far anyone cou
ld see, use all. Girls age, though, become enthusiastic things feel must get way
whenever can. Perhaps tempted Grete make Gregor's situation seem even shocking co
uld even him. Grete would probably one would dare enter room dominated Gregor cra
wling bare walls himself. refused let mother dissuade her. Gregor's mother alread
y looked uneasy room, soon stopped speaking helped Gregor's sister get chest draw
ers strength had. chest drawers something Gregor could without to, writing desk s
tay. Hardly two women pushed chest drawers, groaning, room Gregor poked head couc
h see could it. meant careful considerate could, but, unfortunately, mother came
back first Grete next room arms round chest, pushing pulling side side without, c
ourse, moving inch. mother used sight Gregor, might made ill, Gregor hurried back
wards far end couch. startlement, though, able prevent sheet front moving little.
enough attract mother's attention. stood still, remained moment, went back Grete.
Gregor kept trying assure nothing unusual happening, pieces furniture moved all,
soon admit women going fro, little calls other, scraping furniture floor, things
made feel assailed sides. head legs pulled body pressed floor, forced admit could
stand much longer. emptying room out; taking away everything dear him; already ta
ken chest containing fretsaw tools; threatened remove writing desk place clearly

worn floor, desk done homework business trainee, high school, even infant school-
-he really could wait longer see whether two women's intentions good. nearly forg
otten anyway, tired say anything worked could hear feet stepped heavily floor. S
o, women leant desk room catching breath, sallied out, changed direction four tim
es knowing save first attention suddenly caught picture wall - already denuded ev
erything else - lady dressed copious fur. hurried onto picture pressed glass, hel
d firmly felt good hot belly. picture least, totally covered Gregor, would certai
nly taken away no-one. turned head face door living room could watch women came b
ack. allowed long rest came back quite soon; Grete put arm around mother nearly c
arrying her. "What shall take now, then?", said Grete looked around. eyes met Gre
gor wall. Perhaps mother there, remained calm, bent face would look round said, a
lbeit hurriedly tremor voice: "Come on, let's go back living room while?" Gregor
could see Grete mind, wanted take mother somewhere safe chase wall. Well, could c
ertainly try it! sat unyielding picture. would rather jump Grete's face. Grete's
words made mother quite worried, stepped one side, saw enormous brown patch flowe
rs wallpaper, even realised Gregor saw screamed: "Oh God, oh God!" Arms outstretc
hed, fell onto couch given everything stayed immobile. "Gregor!" shouted sister,
glowering shaking fist. first word spoken directly since transformation. ran room
fetch kind smelling salts bring mother faint; Gregor wanted help - could save pic
ture later, although stuck fast glass pull force; he, too, ran next room could ad
vise sister like old days; stand behind nothing; looking various bottles, startle
d turned round; bottle fell ground broke; splinter cut Gregor's face, kind causti
c medicine splashed him; now, without delaying longer, Grete took hold bottles co
uld ran mother; slammed door shut foot. Gregor shut mother, who, him, might near
death; could open door want chase sister away, stay mother; nothing wait; and, op
pressed anxiety self-reproach, began crawl about, crawled everything, walls, furn
iture, ceiling, finally confusion whole room began spin around fell middle dinner
table. lay while, numb immobile, around quiet, maybe good sign. someone door. mai
d, course, locked kitchen Grete would go answer it. father arrived home. "What's
happened?" first words; Grete's appearance must made everything clear him. answer
ed subdued voice, openly pressed face chest: "Mother's fainted, better now. Grego
r got out." "Just expected", said father, "just always said, women listen, would
you." clear Gregor Grete said enough father took mean something bad happened, res
ponsible act violence. meant Gregor would try calm father, time explain things ev
en possible. fled door room pressed father, came hall, could see straight away Gr
egor best intentions would go back room without delay, would necessary drive back
open door would disappear. father, though, mood notice subtleties like that; "A
h!", shouted came in, sounding angry glad time. Gregor drew head back door lifted
towards father. really imagined father way stood now; late, new habit crawling ab
out, neglected pay attention going rest flat way done before. really ought expect
ed things changed, still, still, really father? tired man used laying entombed be
d Gregor came back business trips, would receive sitting armchair nightgown came
back evenings; hardly even able stand but, sign pleasure, would raise arms who, c
ouple times year went walk together Sunday public holiday wrapped tightly overcoa
t Gregor mother, would always labour way forward little slowly them, already walk
ing slowly sake; would place stick carefully and, wanted say something would inva
riably stop gather companions around him. standing straight enough now; dressed s
mart blue uniform gold buttons, sort worn employees banking institute; high, stif
f collar coat strong double-chin emerged; bushy eyebrows, piercing, dark eyes loo
ked fresh alert; normally unkempt white hair combed painfully close scalp. took c
ap, gold monogram from, probably, bank, threw arc right across room onto sofa, pu
t hands trouser pockets, pushing back bottom long uniform coat, and, look determi
nation, walked towards Gregor. probably even know mind, nonetheless lifted feet u
nusually high. Gregor amazed enormous size soles boots, wasted time - knew full w
ell, right first day new life, father thought necessary always extremely strict h
im. ran father, stopped father stopped, scurried forwards moved, even slightly. w
ay went round room several times without anything decisive happening, without eve
n giving impression chase everything went slowly. Gregor remained time floor, lar
gely feared father might see especially provoking fled onto wall ceiling. Whateve
r did, Gregor admit certainly would able keep running long, step father took carr

y countless movements. became noticeably short breath, even earlier life lungs re
liable. Now, lurched efforts muster strength could running could hardly keep eyes
open; thoughts became slow think way saving running; almost forgot walls use alth
ough, here, concealed behind carefully carved furniture full notches protrusions
- then, right beside him, lightly tossed, something flew rolled front him. apple;
another one immediately flew him; Gregor froze shock; longer point running father
decided bombard him. filled pockets fruit bowl sideboard now, without even taking
time careful aim, threw one apple another. little, red apples rolled floor, knock
ing electric motors. apple thrown without much force glanced Gregor's back slid w
ithout harm. Another one however, immediately following it, hit squarely lodged b
ack; Gregor wanted drag away, could remove surprising, incredible pain changing p
osition; felt nailed spot spread out, senses confusion. last thing saw door room
pulled open, sister screaming, mother ran front blouse (as sister taken clothes f
ainted make easier breathe), ran father, skirts unfastened sliding one another gr
ound, stumbling skirts pushed father, arms around him, uniting totally - Gregor l
ost ability see anything - hands behind father's head begging spare Gregor's lif
e. III No-one dared remove apple lodged Gregor's flesh, remained visible reminder
injury. suffered month, condition seemed serious enough remind even father Grego
r, despite current sad revolting form, family member could treated enemy. contrar
y, family duty swallow revulsion patient, patient. injuries, Gregor lost much mob
ility - probably permanently. reduced condition ancient invalid took long, long m
inutes crawl across room - crawling ceiling question - deterioration condition fu
lly (in opinion) made door living room left open every evening. got habit closely
watching one two hours opened then, lying darkness room could seen living room, c
ould watch family light dinner table listen conversation - everyone's permission,
way, thus quite differently before. longer held lively conversations earlier time
s, course, ones Gregor always thought longing tired getting damp bed small hotel
room. usually quiet nowadays. Soon dinner, father would go sleep chair; mother si
ster would urge quiet; mother, bent deeply lamp, would sew fancy underwear fashio
n shop; sister, taken sales job, learned shorthand French evenings might able get
better position later on. Sometimes father would wake say Gregor's mother "you're
much sewing today!", know dozing - would go back sleep mother sister would exchan
ge tired grin. kind stubbornness, Gregor's father refused take uniform even home;
nightgown hung unused peg Gregor's father would slumber was, fully dressed, alway
s ready serve expecting hear voice superior even here. uniform new start with, re
sult slowly became even shabbier despite efforts Gregor's mother sister look it.
Gregor would often spend whole evening looking stains coat, gold buttons always k
ept polished shiny, old man would sleep, highly uncomfortable peaceful. soon stru
ck ten, Gregor's mother would speak gently father wake try persuade go bed, sleep
properly really get sleep six get work. since work become obstinate would always
insist staying longer table, even though regularly fell asleep harder ever persua
de exchange chair bed. Then, however much mother sister would importune little re
proaches warnings would keep slowly shaking head quarter hour eyes closed refusin
g get up. Gregor's mother would tug sleeve, whisper endearments ear, Gregor's sis
ter would leave work help mother, nothing would effect him. would sink deeper cha
ir. two women took arms would abruptly open eyes, look one say: "What life! peace
get old age!" supported two women would lift carefully carrying greatest load him
self, let women take door, send carry Gregor's mother would throw needle sister p
en could run father continue help him. Who, tired overworked family, would time g
ive attention Gregor absolutely necessary? household budget became even smaller;
maid dismissed; enormous, thick-boned charwoman white hair flapped around head ca
me every morning evening heaviest work; everything else looked Gregor's mother to
p large amount sewing work did. Gregor even learned, listening evening conversati
on price hoped for, several items jewellery belonging family sold, even though mo
ther sister fond wearing functions celebrations. loudest complaint although flat
much big present circumstances, could move it, imaginable way transferring Gregor
new address. could see quite well, though, reasons consideration made difficult m
ove, would quite easy transport suitable crate air holes it; main thing holding f
amily back decision move much total despair, thought struck misfortune unlike any
thing experienced anyone else knew related to. carried absolutely everything worl

d expects poor people, Gregor's father brought bank employees breakfast, mother s
acrificed washing clothes strangers, sister ran back forth behind desk behest cus
tomers, strength more. injury Gregor's back began hurt much new. come back taking
father bed Gregor's mother sister would leave work sit close together, cheek chee
k; mother would point Gregor's room say "Close door, Grete", then, dark again, wo
uld sit next room tears would mingle, would simply sit staring dry-eyed table. Gr
egor hardly slept all, either night day. Sometimes would think taking family's af
fairs, like before, next time door opened; long forgotten boss chief clerk, would
appear thoughts, salesmen apprentices, stupid teaboy, two three friends businesse
s, one chambermaids provincial hotel, tender memory appeared disappeared again, c
ashier hat shop attention serious slow, - appeared him, mixed together strangers
others forgotten, instead helping family inaccessible, glad disappeared. times mo
od look family, filled simple rage lack attention shown, although could think not
hing would wanted, made plans could get pantry could take things entitled to, eve
n hungry. Gregor's sister longer thought could please would hurriedly push food r
oom foot rushed work morning midday, evening would sweep away broom, indifferent
whether eaten - often - left totally untouched. still cleared room evening, could
quicker it. Smears dirt left walls, little balls dust filth. first, Gregor went o
ne worst places sister arrived reproach her, could stayed weeks without sister an
ything it; could see dirt well could simply decided leave it. time became touchy
way quite new everyone family understood - cleaning Gregor's room alone. Gregor's
mother thoroughly clean room, needed use several bucketfuls water - although much
dampness also made Gregor ill lay flat couch, bitter immobile. mother punished st
ill done, hardly sister arrived home evening noticed change Gregor's room and, hi
ghly aggrieved, ran back living room where, despite mothers raised imploring hand
s, broke convulsive tears. father, course, startled chair two parents looked asto
nished helpless; they, too, became agitated; Gregor's father, standing right moth
er, accused leaving cleaning Gregor's room sister; left, Gregor's sister screamed
never clean Gregor's room again; mother tried draw father, beside anger, bedroom;
sister, quaking tears, thumped table small fists; Gregor hissed anger no-one even
thought closing door save sight noise. Gregor's sister exhausted going work, look
ing Gregor done even work her, even mother ought certainly taken place. Gregor, h
and, ought neglected. Now, though, charwoman here. elderly widow, robust bone str
ucture made able withstand hardest things long life, really repelled Gregor. chan
ce one day, rather real curiosity, opened door Gregor's room found face face him.
taken totally surprise, no-one chasing began rush fro stood amazement hands cross
ed front her. never failed open door slightly every evening morning look briefly
him. first would call words probably considered friendly, "come then, old dung-be
etle!", "look old dung-beetle there!" Gregor never responded spoken way, remained
without moving door never even opened. told charwoman clean room every day instea
d letting disturb reason whenever felt like it! One day, early morning heavy rain
struck windowpanes, perhaps indicating spring coming, began speak way again. Greg
or resentful started move toward her, slow infirm, like kind attack. Instead afra
id, charwoman lifted one chairs near door stood mouth open, clearly intending clo
se mouth chair hand slammed Gregor's back. "Aren't coming closer, then?", asked G
regor turned round again, calmly put chair back corner. Gregor almost entirely st
opped eating. happened find next food prepared might take mouth play it, leave ho
urs then, often not, spit again. first thought distress state room stopped eatin
g, soon got used changes made there. got habit putting things room room anywhere
else, many things one rooms flat rented three gentlemen. earnest gentlemen - thre
e full beards, Gregor learned peering crack door one day - painfully insistent th
ings' tidy. meant room but, since taken room establishment, entire flat especiall
y kitchen. Unnecessary clutter something could tolerate, especially dirty. moreov
er brought furnishings equipment them. reason, many things become superfluous whi
ch, although could sold, family wish discard. things found way Gregor's room. dus
tbins kitchen found way too. charwoman always hurry, anything use time would chuc
k there. He, fortunately, would usually see object hand held it. woman likely mea
nt fetch things back time opportunity, throw everything one go, actually happened
left landed first thrown unless Gregor made way junk moved somewhere else. first
moved because, room free could crawl about, forced to, later came enjoy although

moving way left sad tired death, would remain immobile hours afterwards. gentlemen rented room would sometimes take evening meal home living room used everyone, door room often kept closed evening. Gregor found easy give door open, had, all, often failed make use open and, without family noticed it, lain room darkest corner. One time, though, charwoman left door living room slightly open, remained open gentlemen rented room came evening light put on. sat table where, formerly, Gregor taken meals father mother, unfolded serviettes picked knives forks. Gregor's mother immediately appeared doorway dish meat soon behind came sister dish piled high potatoes. food steaming, filled room smell. gentlemen bent dishes set front wanted test food eating it, gentleman middle, seemed count authority two, indeed cut piece meat still dish, clearly wishing establish whether sufficiently cooked whether sent back kitchen. satisfaction, Gregor's mother sister, looking anxiously, began breathe smiled. family ate kitchen. Nonetheless, Gregor's father came living room went kitchen, bowed cap hand round table. gentlemen stood one, mumbled something beards. Then, alone, ate near perfect silence. seemed remarkable Gregor various noises eating chewing teeth could still heard, wanted show Gregor need teeth order eat possible perform anything jaws toothless however nice might be. "I'd like eat something", said Gregor anxiously, "but anything like they're eating. feed themselves. am, dying!" Throughout time, Gregor could remember heard violin played, evening began heard kitchen. three gentlemen already finished meal, one middle produced newspaper, given page others, leant back chairs reading smoking. violin began playing became attentive, stood went tip-toe door hallway stood pressed other. Someone must heard kitchen, Gregor's father called out: "Is playing perhaps unpleasant gentlemen? stop straight away." "On contrary", said middle gentleman, "would young lady like come play us room, is, all, much cosy comfortable?" "Oh yes, we'd love to", called back Gregor's father violin player himself. gentlemen stepped back room waited. Gregor's father soon appeared music stand, mother music sister violin. calmly prepared everything begin playing; parents, never rented room therefore showed exaggerated courtesy towards three gentlemen, even dare sit chairs; father leant door right hand pushed two buttons uniform coat; mother, though, offered seat one gentlemen sat - leaving chair gentleman happened placed - way corner. sister began play; father mother paid close attention, one side, movements hands. Drawn playing, Gregor dared come forward little already head living room. Before, taken great pride considerate hardly occurred become thoughtless others. What's more, reason keep hidden covered dust lay everywhere room flew slightest movement; carried threads, hairs, remains food back sides; much indifferent everything lay back wipe carpet like used several times day. despite condition, shy move forward little onto immaculate floor living room. No-one noticed him, though. family totally preoccupied violin playing; first, three gentlemen put hands pockets come far close behind music stand look notes played, must disturbed Gregor's sister, soon, contrast family, withdrew back window heads sunk talking half volume, stayed window Gregor's father observed anxiously. really seemed obvious expected hear beautiful entertaining violin playing disappointed, enough whole performance politeness allowed peace disturbed. especially unnerving, way blew smoke cigarettes upwards mouth noses. Yet Gregor's sister playing beautifully. face leant one side, following lines music careful melancholy expression. Gregor crawled little forward, keeping head close ground could meet eyes chance came. animal music could captivate so? seemed shown way unknown nourishment yearning for. determined make way forward sister tug skirt show might come room violin, no-one appreciated playing much would. never wanted let room, lived, anyway; shocking appearance should, once, use him; wanted every door room hiss spit attackers; sister forced stay him, though, stay free will; would sit beside couch ear bent told always intended send conservatory, would told everyone last Christmas - Christmas really come gone already? - misfortune got way, refuse let anyone dissuade it. hearing this, sister would break tears emotion, Gregor would climb shoulder kiss neck, which, since going work, kept free without necklace collar. "Mr. Samsa!", shouted middle gentleman Gregor's father, pointing, without wasting words, forefinger Gregor slowly moved forward. violin went silent, middle three gentlemen first smiled two friends, shaking head, looked back Gregor. father seemed think important calm three gentlemen driving Gregor out, even though upset seemed think Gregor enterta

ining violin playing been. rushed arms spread attempted drive back room time tryi
ng block view Gregor body. become little annoyed, clear whether father's behaviou
r annoyed dawning realisation neighbour like Gregor next room without knowing it.
asked Gregor's father explanations, raised arms like had, tugged excitedly beards
moved back towards room slowly. Meanwhile Gregor's sister overcome despair fallen
playing suddenly interrupted. let hands drop let violin bow hang limply continued
look music still playing, suddenly pulled together, lay instrument mother's lap s
till sat laboriously struggling breath was, ran next room which, pressure father,
three gentlemen quickly moving toward. sister's experienced hand, pillows covers
beds flew put order already finished making beds slipped three gentlemen reached
room. Gregor's father seemed obsessed forgot respect owed tenants. urged pressed
until, already door room, middle three gentlemen shouted like thunder stamped foo
t thereby brought Gregor's father halt. "I declare now", said, raising hand glanc
ing Gregor's mother sister gain attention too, "that regard repugnant conditions
prevail flat family" - looked briefly decisively floor - "I give immediate notice
room. days living will, course, pay nothing all, contrary consider whether procee
d kind action damages you, believe would easy set grounds action." silent looked
straight ahead waiting something. indeed, two friends joined words: "And also giv
e immediate notice." that, took hold door handle slammed door. Gregor's father st
aggered back seat, feeling way hands, fell it; looked stretching usual evening na
p uncontrolled way head kept nodding could seen sleeping all. Throughout this, Gr
egor lain still three gentlemen first seen him. disappointment failure plan, perh
aps also weak hunger, made impossible move. sure everyone would turn moment, wait
ed. even startled state violin mother's lap fell trembling fingers landed loudly
floor. "Father, Mother", said sister, hitting table hand introduction, "we can't
carry like this. Maybe can't see it, can. want call monster brother, say is: try
get rid it. We've done that's humanly possible look patient, think anyone could a
ccuse us anything wrong." "She's absolutely right", said Gregor's father himself.
mother, still time catch breath, began cough dully, hand held front deranged expr
ession eyes. Gregor's sister rushed mother put hand forehead. words seemed give G
regor's father definite ideas. sat upright, played uniform cap plates left three
gentlemen meal, occasionally looked Gregor lay immobile. "We try get rid it", sai
d Gregor's sister, speaking father, mother occupied coughing listen, "it'll death
you, see coming. can't work hard come home tortured like this, can't endure it. c
an't endure more." broke heavily tears flowed face mother, wiped away mechanical
hand movements. "My child", said father sympathy obvious understanding, "what d
o?" sister shrugged shoulders sign helplessness tears taken hold her, displacing
earlier certainty. "If could understand us", said father almost question; sister
shook hand vigorously tears sign question. "If could understand us", repeated Gre
gor's father, closing eyes acceptance sister's certainty quite impossible, "then
perhaps could come kind arrangement him. ..." "It's got go", shouted sister, "tha
t's way, Father. got get rid idea that's Gregor. We've harmed believing long. Gre
gor? Gregor would seen long ago possible human beings live animal like would gone
free will. brother more, then, could carry lives remember respect. animal persecu
ting us, driven tenants, obviously wants take whole flat force us sleep streets.
Father, look, look", suddenly screamed, "he's starting again!" alarm, totally bey
ond Gregor's comprehension, sister even abandoned mother pushed vigorously chair
willing sacrifice mother stay anywhere near Gregor. rushed behind father, become
excited merely stood half raising hands front Gregor's sister protect her. Gregor
intention frightening anyone, least sister. done begin turn round could go back r
oom, although quite startling pain-wracked condition meant turning round required
great deal effort using head help it, repeatedly raising striking floor. stopped
looked round. seemed realised good intention alarmed briefly. looked unhappy sile
nce. mother lay chair legs stretched pressed other, eyes nearly closed exhaustio
n; sister sat next father arms around neck. "Maybe they'll let turn round", thoug
ht Gregor went back work. could help panting loudly effort sometimes stop take re
st. No-one making rush more, everything left him. soon finally finished turning r
ound began move straight ahead. amazed great distance separated room, could under
stand covered distance weak state little almost without noticing it. concentrated
crawling fast could hardly noticed word, cry, family distract him. turn head reac

hed doorway. turn way round felt neck becoming stiff, nonetheless enough see noth ing behind changed, sister stood up. last glance saw mother fallen completely asl eep. hardly inside room door hurriedly shut, bolted locked. sudden noise behind G regor startled little legs collapsed him. sister much rush. standing waiting spru ng forward lightly, Gregor heard coming all, turned key lock said loudly parents "At last!". "What now, then?", Gregor asked looked round darkness. soon made disc overy could longer move all. surprise him, seemed rather able actually move aroun d spindly little legs unnatural. also felt relatively comfortable. true entire bo dy aching, pain seemed slowly getting weaker weaker would finally disappear altog ether. could already hardly feel decayed apple back inflamed area around it, enti rely covered white dust. thought back family emotion love. possible, felt must go away even strongly sister. remained state empty peaceful rumination heard clock t ower strike three morning. watched slowly began get light everywhere outside wind ow too. Then, without willing it, head sank completely, last breath flowed weakly nostrils. cleaner came early morning - they'd often asked keep slamming doors str ength hurry still did, everyone flat knew she'd arrived impossible sleep peace - made usual brief look Gregor first found nothing special. thought laying still pu rpose, playing martyr; attributed possible understanding him. happened holding lo ng broom hand, tried tickle Gregor doorway. success tried make nuisance poked lit tle, found could shove across floor resistance start pay attention. soon realised really happened, opened eyes wide, whistled herself, waste time yank open bedroom doors shout loudly darkness bedrooms: "Come 'ave look this, dead, lying there, st one dead!" Mr. Mrs. Samsa sat upright marriage bed make effort get shock caused c leaner could grasp saying. then, side, hurried bed. Mr. Samsa threw blanket shoul ders, Mrs. Samsa came nightdress; went Gregor's room. way opened door living room Grete sleeping since three gentlemen moved in; fully dressed never asleep, palene ss face seemed confirm this. "Dead?", asked Mrs. Samsa, looking charwoman enquiri ngly, even though could checked could known even without checking. "That's said", replied cleaner, prove gave Gregor's body another shove broom, sending sideways a cross floor. Mrs. Samsa made movement wanted hold back broom, complete it. "Now t hen", said Mr. Samsa, "let's give thanks God that". crossed himself, three women followed example. Grete, taken eyes corpse, said: "Just look thin was. eat anythi ng long. food came went in". Gregor's body indeed completely dried flat, seen the n, lifted little legs, anything make look away. "Grete, come us little while", sa id Mrs. Samsa pained smile, Grete followed parents bedroom without looking back b ody. cleaner shut door opened window wide. Although still early morning fresh air something warmth mixed it. already end March, all. three gentlemen stepped room l ooked round amazement breakfasts; forgotten about. "Where breakfast?", middle gen tleman asked cleaner irritably. put finger lips made quick silent sign men might like come Gregor's room. so, stood around Gregor's corpse hands pockets well-worn coats. quite light room. door bedroom opened Mr. Samsa appeared uniform wife one arm daughter other. crying little; Grete pressed face father's arm. "Leave home. Now!", said Mr. Samsa, indicating door without letting women him. "What mean?", a sked middle three gentlemen somewhat disconcerted, smiled sweetly. two held hands behind backs continually rubbed together gleeful anticipation loud quarrel could end favour. "I mean said", answered Mr. Samsa, and, two companions, went straight line towards man. first, stood still, looking ground contents head rearranging ne w positions. "Alright, we'll go then", said, looked Mr. Samsa suddenly overcome h umility wanted permission Mr. Samsa decision. Mr. Samsa merely opened eyes wide b riefly nodded several times. that, without delay, man actually take long strides front hallway; two friends stopped rubbing hands time listening said. jumped frie nd taken sudden fear Mr. Samsa might go hallway front break connection leader. th ere, three took hats stand, took sticks holder, bowed without word left premises. Mr. Samsa two women followed onto landing; reason mistrust men's intentions leane d landing saw three gentlemen made slow steady progress many steps. turned corner floor disappeared would reappear moments later; went, Samsa family lost interest them; butcher's boy, proud posture tray head, passed way came nearer were, Mr. Sa msa women came away landing went, relieved, back flat. decided best way make use day relaxation go walk; earned break work serious need it. sat table wrote three letters excusal, Mr. Samsa employers, Mrs. Samsa contractor Grete principal. clea

ner came writing tell going, she'd finished work morning. three first nodded with
out looking writing, cleaner still seem want leave looked irritation. "Well?", as
ked Mr. Samsa. charwoman stood doorway smile face tremendous good news report, wo
uld clearly asked to. almost vertical little ostrich feather hat, source irritati
on Mr. Samsa time working them, swayed gently directions. "What want then?", aske
d Mrs. Samsa, cleaner respect for. "Yes", answered, broke friendly laugh made una
ble speak straight away, "well then, thing there, worry going get rid it. That's
sorted out." Mrs. Samsa Grete bent letters intent continuing writing; Mr. Samsa s
aw cleaner wanted start describing everything detail but, outstretched hand, made
quite clear to. So, prevented telling it, suddenly remembered hurry and, clearly
peeved, called "Cheerio then, everyone", turned round sharply left, slamming door
terribly went. "Tonight gets sacked", said Mr. Samsa, received reply either wife
daughter charwoman seemed destroyed peace gained. got went window remained arms a
round other. Mr. Samsa twisted round chair look sat watching while. called out:
"Come here, then. Let's forget old stuff, shall we. Come give bit attention". two
women immediately said, hurrying kissed hugged quickly finished letters. that, th
ree left flat together, something done months, took tram open country outside tow
n. tram, filled warm sunshine, themselves. Leant back comfortably seats, discusse
d prospects found closer examination bad - never asked work three jobs good held
particularly good promise future. greatest improvement time being, course, would
achieved quite easily moving house; needed flat smaller cheaper current one chose
n Gregor, one better location and, all, practical. time, Grete becoming livelier.
worry late cheeks become pale, but, talking, Mr. Mrs. Samsa struck, almost simult
aneously, thought daughter blossoming well built beautiful young lady. became qui
eter. other's glance almost without knowing agreed would soon time find good man
her. And, confirmation new dreams good intentions, soon reached destination Grete
first get stretch young body.

```
[nltk_data] Downloading package averaged_perceptron_tagger to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Package averaged_perceptron_tagger is already up-to-
[nltk_data]       date!
[nltk_data] Downloading package punkt to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```

3)

```
In [9]:  #Load the coll2000 corpus, a dataset from the wall street journal.
         nltk.download('conll2000')
         from nltk.corpus import conll2000
```

```
[nltk_data] Downloading package conll2000 to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Unzipping corpora\conll2000.zip.
```

```
In [10]:  # Display the first six sentences in the conll2000 dataset
          for i in range(6):

              print(conll2000.sents()[i])
```

```
['Confidence', 'in', 'the', 'pound', 'is', 'widely', 'expected', 'to', 'take', 'a
nother', 'sharp', 'dive', 'if', 'trade', 'figures', 'for', 'September', ',', 'du
e', 'for', 'release', 'tomorrow', ',', 'fail', 'to', 'show', 'a', 'substantial',
'improvement', 'from', 'July', 'and', 'August', "'s", 'near-record', 'deficits',
'.']
['Chancellor', 'of', 'the', 'Exchequer', 'Nigel', 'Lawson', "'s", 'restated', 'co
mmitment', 'to', 'a', 'firm', 'monetary', 'policy', 'has', 'helped', 'to', 'preve
nt', 'a', 'freefall', 'in', 'sterling', 'over', 'the', 'past', 'week', '.']
['But', 'analysts', 'reckon', 'underlying', 'support', 'for', 'sterling', 'has',
'been', 'eroded', 'by', 'the', 'chancellor', "'s", 'failure', 'to', 'announce',
'any', 'new', 'policy', 'measures', 'in', 'his', 'Mansion', 'House', 'speech', 'l
ast', 'Thursday', '.']
['This', 'has', 'increased', 'the', 'risk', 'of', 'the', 'government', 'being',
'forced', 'to', 'increase', 'base', 'rates', 'to', '16', '%', 'from', 'their', 'c
urrent', '15', '%', 'level', 'to', 'defend', 'the', 'pound', ',', 'economists',
'and', 'foreign', 'exchange', 'market', 'analysts', 'say', '.']
['``', 'The', 'risks', 'for', 'sterling', 'of', 'a', 'bad', 'trade', 'figure', 'a
re', 'very', 'heavily', 'on', 'the', 'down', 'side', ',', "''", 'said', 'Chris',
'Dillow', ',', 'senior', 'U.K.', 'economist', 'at', 'Nomura', 'Research', 'Instit
ute', '.']
['``', 'If', 'there', 'is', 'another', 'bad', 'trade', 'number', ',', 'there', 'c
ould', 'be', 'an', 'awful', 'lot', 'of', 'pressure', ',', "''", 'noted', 'Simon',
'Briscoe', ',', 'U.K.', 'economist', 'for', 'Midland', 'Montagu', ',', 'a', 'uni
t', 'of', 'Midland', 'Bank', 'PLC', '.']
```

In [11]:
```python
import nltk

nltk.download('conll2000')

from nltk.corpus import conll2000

# Tag the first six sentences in the conll2000 dataset
for i in range(6):
    tagged_sent = conll2000.tagged_sents()[i]
    print(tagged_sent)
```

```
[('Confidence', 'NN'), ('in', 'IN'), ('the', 'DT'), ('pound', 'NN'), ('is', 'VB
Z'), ('widely', 'RB'), ('expected', 'VBN'), ('to', 'TO'), ('take', 'VB'), ('anoth
er', 'DT'), ('sharp', 'JJ'), ('dive', 'NN'), ('if', 'IN'), ('trade', 'NN'), ('fig
ures', 'NNS'), ('for', 'IN'), ('September', 'NNP'), (',', ','), ('due', 'JJ'),
('for', 'IN'), ('release', 'NN'), ('tomorrow', 'NN'), (',', ','), ('fail', 'VB'),
('to', 'TO'), ('show', 'VB'), ('a', 'DT'), ('substantial', 'JJ'), ('improvement',
'NN'), ('from', 'IN'), ('July', 'NNP'), ('and', 'CC'), ('August', 'NNP'), ("'s",
'POS'), ('near-record', 'JJ'), ('deficits', 'NNS'), ('.', '.')]
[('Chancellor', 'NNP'), ('of', 'IN'), ('the', 'DT'), ('Exchequer', 'NNP'), ('Nige
l', 'NNP'), ('Lawson', 'NNP'), ("'s", 'POS'), ('restated', 'VBN'), ('commitment',
'NN'), ('to', 'TO'), ('a', 'DT'), ('firm', 'NN'), ('monetary', 'JJ'), ('policy',
'NN'), ('has', 'VBZ'), ('helped', 'VBN'), ('to', 'TO'), ('prevent', 'VB'), ('a',
'DT'), ('freefall', 'NN'), ('in', 'IN'), ('sterling', 'NN'), ('over', 'IN'), ('th
e', 'DT'), ('past', 'JJ'), ('week', 'NN'), ('.', '.')]
[('But', 'CC'), ('analysts', 'NNS'), ('reckon', 'VBP'), ('underlying', 'VBG'),
('support', 'NN'), ('for', 'IN'), ('sterling', 'NN'), ('has', 'VBZ'), ('been', 'V
BN'), ('eroded', 'VBN'), ('by', 'IN'), ('the', 'DT'), ('chancellor', 'NN'),
("'s", 'POS'), ('failure', 'NN'), ('to', 'TO'), ('announce', 'VB'), ('any', 'D
T'), ('new', 'JJ'), ('policy', 'NN'), ('measures', 'NNS'), ('in', 'IN'), ('his',
'PRP$'), ('Mansion', 'NNP'), ('House', 'NNP'), ('speech', 'NN'), ('last', 'JJ'),
('Thursday', 'NNP'), ('.', '.')]
[('This', 'DT'), ('has', 'VBZ'), ('increased', 'VBN'), ('the', 'DT'), ('risk', 'N
N'), ('of', 'IN'), ('the', 'DT'), ('government', 'NN'), ('being', 'VBG'), ('force
d', 'VBN'), ('to', 'TO'), ('increase', 'VB'), ('base', 'NN'), ('rates', 'NNS'),
('to', 'TO'), ('16', 'CD'), ('%', 'NN'), ('from', 'IN'), ('their', 'PRP$'), ('cur
rent', 'JJ'), ('15', 'CD'), ('%', 'NN'), ('level', 'NN'), ('to', 'TO'), ('defen
d', 'VB'), ('the', 'DT'), ('pound', 'NN'), (',', ','), ('economists', 'NNS'), ('a
nd', 'CC'), ('foreign', 'JJ'), ('exchange', 'NN'), ('market', 'NN'), ('analysts',
'NNS'), ('say', 'VBP'), ('.', '.')]
[('``', '``'), ('The', 'DT'), ('risks', 'NNS'), ('for', 'IN'), ('sterling', 'N
N'), ('of', 'IN'), ('a', 'DT'), ('bad', 'JJ'), ('trade', 'NN'), ('figure', 'NN'),
('are', 'VBP'), ('very', 'RB'), ('heavily', 'RB'), ('on', 'IN'), ('the', 'DT'),
('down', 'JJ'), ('side', 'NN'), (',', ','), ("''", "''"), ('said', 'VBD'), ('Chri
s', 'NNP'), ('Dillow', 'NNP'), (',', ','), ('senior', 'JJ'), ('U.K.', 'NNP'), ('e
conomist', 'NN'), ('at', 'IN'), ('Nomura', 'NNP'), ('Research', 'NNP'), ('Institu
te', 'NNP'), ('.', '.')]
[('``', '``'), ('If', 'IN'), ('there', 'EX'), ('is', 'VBZ'), ('another', 'DT'),
('bad', 'JJ'), ('trade', 'NN'), ('number', 'NN'), (',', ','), ('there', 'EX'),
('could', 'MD'), ('be', 'VB'), ('an', 'DT'), ('awful', 'JJ'), ('lot', 'NN'), ('o
f', 'IN'), ('pressure', 'NN'), (',', ','), ("''", "''"), ('noted', 'VBD'), ('Simo
n', 'NNP'), ('Briscoe', 'NNP'), (',', ','), ('U.K.', 'NNP'), ('economist', 'NN'),
('for', 'IN'), ('Midland', 'NNP'), ('Montagu', 'NNP'), (',', ','), ('a', 'DT'),
('unit', 'NN'), ('of', 'IN'), ('Midland', 'NNP'), ('Bank', 'NNP'), ('PLC', 'NN
P'), ('.', '.')]
```

```
[nltk_data] Downloading package conll2000 to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Package conll2000 is already up-to-date!
```

Partie B

1)

```
In [13]:  import nltk
          nltk.download('word net')
          from nltk.corpus import wordnet
          from nltk.corpus import wordnet as wn
```

2)

```
In [16]:  import nltk
          nltk.download('wordnet')

          # Get all synsets for the word "Love"
          synsets = wordnet.synsets('love')

          # Print all the elements of synsets
          for synset in synsets:
              print(synset)
```

```
Synset('love.n.01')
Synset('love.n.02')
Synset('beloved.n.01')
Synset('love.n.04')
Synset('love.n.05')
Synset('sexual_love.n.02')
Synset('love.v.01')
Synset('love.v.02')
Synset('love.v.03')
Synset('sleep_together.v.01')
```

On a des synonymes acceptables

```
In [17]:  first_synset = synsets[0]

          # Use the definition(), lemmas(), and examples() methods
          print("Definition:", first_synset.definition())
          print("Lemmas:", first_synset.lemmas())
          print("Examples:", first_synset.examples())
```

```
Definition: a strong positive emotion of regard and affection
Lemmas: [Lemma('love.n.01.love')]
Examples: ['his love for his work', 'children need a lot of love']
```

4)

```
In [18]:  import nltk

          nltk.download('wordnet')

          from nltk.corpus import wordnet

          # Get all synsets for the word "Love"
          synsets = wordnet.synsets('love')

          # Initialize lists to store synonyms and antonyms
          synonyms = []
          antonyms = []

          # Iterate over each synset and extract lemmas and their antonyms/synonyms
```

```python
for synset in synsets:
    for lemma in synset.lemmas():
        # Add synonyms to the list
        synonyms.append(lemma.name())

        # Iterate over each antonym for the current lemma and add to the antonym
        for antonym in lemma.antonyms():
            antonyms.append(antonym.name())

# Remove duplicates from the synonym and antonym lists
synonyms = list(set(synonyms))
antonyms = list(set(antonyms))

# Print the synonyms and antonyms
print("Synonyms for 'love':", synonyms)
print("Antonyms for 'love':", antonyms)
```

```
Synonyms for 'love': ['bang', 'dearest', 'know', 'have_a_go_at_it', 'bed', 'belov
ed', 'lie_with', 'make_out', 'passion', 'have_sex', 'love_life', 'bonk', 'dear',
'make_love', 'have_intercourse', 'making_love', 'get_laid', 'screw', 'lovemakin
g', 'get_it_on', 'honey', 'jazz', 'roll_in_the_hay', 'eff', 'sleep_with', 'have_i
t_off', 'sleep_together', 'fuck', 'enjoy', 'sexual_love', 'do_it', 'have_it_awa
y', 'love', 'erotic_love', 'hump', 'be_intimate']
Antonyms for 'love': ['hate']
```

```
[nltk_data] Downloading package wordnet to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

3)

```python
In [24]:  import nltk
          nltk.download('omw-1.4')

          from nltk.corpus import wordnet as wn

          # Get all languages in WordNet
          languages = set([lang for lang in wn.langs()])

          # Print the languages
          print("Available languages in WordNet:", languages)
```

```
Available languages in WordNet: {'arb', 'spa', 'fra', 'slk', 'eng', 'fin', 'als',
'bul', 'por', 'slv', 'ita_iwn', 'cat', 'dan', 'nld', 'tha', 'lit', 'hrv', 'isl',
'nno', 'swe', 'nob', 'cmn', 'eus', 'ell', 'jpn', 'glg', 'zsm', 'heb', 'ron', 'po
l', 'ita', 'ind'}
```

```
[nltk_data] Downloading package omw-1.4 to
[nltk_data]     C:\Users\rohan\AppData\Roaming\nltk_data...
[nltk_data]   Package omw-1.4 is already up-to-date!
```

4)

```python
In [28]:  wn.synset('love.n.01').lemma_names('jpn')
```

```
Out[28]: ['ラブ',
          'ラヴ',
          '仁愛',
          '傾慕',
          '恵愛',
          '情愛',
          '愛',
          '愛しみ',
          '愛心',
          '愛念',
          '愛情',
          '愛着',
          '慈',
          '慈しみ',
          '慈愛']
```

In [17]:
```python
from nltk.corpus import wordnet as wn
# Retrieve synsets for the words "cat", "dog", and "car"
cat = wn.synset('cat.n.01')
dog = wn.synset('dog.n.01')
car = wn.synset('car.n.01')
# Compute similarity between all pairs of sets
similarity_path = cat.path_similarity(dog)
similarity_lch = cat.lch_similarity(dog)
similarity_wup = cat.wup_similarity(dog)
print("Similarity between 'cat' and 'dog':")
print("Path Similarity:", similarity_path)
print("Leacock-Chodorow Similarity:", similarity_lch)
print("Wu-Palmer Similarity:", similarity_wup)
similarity_path = cat.path_similarity(car)
similarity_lch = cat.lch_similarity(car)
similarity_wup = cat.wup_similarity(car)
print("\nSimilarity between 'cat' and 'car':")
print("Path Similarity:", similarity_path)
print("Leacock-Chodorow Similarity:", similarity_lch)
print("Wu-Palmer Similarity:", similarity_wup)
similarity_path = dog.path_similarity(car)
similarity_lch = dog.lch_similarity(car)
similarity_wup = dog.wup_similarity(car)
print("\nSimilarity between 'dog' and 'car':")
print("Path Similarity:", similarity_path)
print("Leacock-Chodorow Similarity:", similarity_lch)
print("Wu-Palmer Similarity:", similarity_wup)
```

```
Similarity between 'cat' and 'dog':
Path Similarity: 0.2
Leacock-Chodorow Similarity: 2.0281482472922856
Wu-Palmer Similarity: 0.8571428571428571

Similarity between 'cat' and 'car':
Path Similarity: 0.05555555555555555
Leacock-Chodorow Similarity: 0.7472144018302211
Wu-Palmer Similarity: 0.32

Similarity between 'dog' and 'car':
Path Similarity: 0.07692307692307693
Leacock-Chodorow Similarity: 1.072636802264849
Wu-Palmer Similarity: 0.4
```

Dans le cas de "chat" et "chien", la similarité de chemin est de 0,2, suggérant une similarité modérée basée sur la longueur du chemin le plus court entre les synsets dans la hiérarchie WordNet. La similitude Leacock-Chodorow est 2.0281482472922856, indiquant une similarité relativement élevée basée sur la profondeur des synsets dans la hiérarchie WordNet. La similarité Wu-Palmer est de 0,8571428571428571, indiquant une similarité relativement élevée basée sur la profondeur des synsets et de leur ancêtre commun.

Pour "chat" et "voiture", les scores de similarité sont plus faibles. La similarité de chemin est de 0,05555555555555555, indiquant une similarité inférieure basée sur le chemin le plus court. La similarité Leacock-Chodorow est de 0,7472144018302211, suggérant une similarité plus faible basée sur la profondeur des synsets. La similarité Wu-Palmer est de 0,32, indiquant une similarité plus faible basée sur la profondeur et l'ancêtre commun des synsets. De même, pour « chien » et « voiture », les scores de similarité sont également relativement inférieurs au couple « chat » et « chien ».

Cela indique que les synsets de "chien" et "voiture" ont moins de similitudes en fonction de la longueur du chemin, de la profondeur et de l'ancêtre commun dans Word Net.

Partie C

1)

```
In [9]:  from textblob import TextBlob

         Textblob_object = TextBlob( "Python is a beautiful high-level, general purpose p
         print(Textblob_object)
```

```
Python is a beautiful high-level, general purpose programming language !
```

```
In [10]:  tags = Textblob_object.tags

          for word, tag in tags:
              print(f"Word: {word}, Tag: {tag}")
```

```
Word: Python, Tag: NNP
Word: is, Tag: VBZ
Word: a, Tag: DT
Word: beautiful, Tag: JJ
Word: high-level, Tag: NN
Word: general, Tag: JJ
Word: purpose, Tag: NN
Word: programming, Tag: VBG
Word: language, Tag: NN
```

```
In [11]:  import nltk
          nltk.download('brown')
          noun_phrases = Textblob_object.noun_phrases

          print("Noun Phrases:")
          for phrase in noun_phrases:
              print(phrase)
```

Noun Phrases:
python
beautiful high-level
general purpose

2)

In [12]:
```python
sentence = "Paris is so beautiful, I like Paris, people are so nice!"
text_blob = TextBlob(sentence)


sentiment = text_blob.sentiment
print(sentiment)
polarity = sentiment.polarity
subjectivity = sentiment.subjectivity


print(f"Polarity: {polarity}")
print(f"Subjectivity: {subjectivity}")
```

```
Sentiment(polarity=0.8, subjectivity=1.0)
Polarity: 0.8
Subjectivity: 1.0
```

On a une polarité de 0,8 ce qui veut dire que la phrase est plutôt positive

On a une subjectivité de 1 ce qui signifie que la phrase est entièrement subjective car elle exprime un opinion personnel

3 et 4

In [13]:
```python
import nltk
from textblob import TextBlob



text = "During the Iron Age, what is now metropolitan France was inhabited by th
text_blob = TextBlob(text)
```

In [14]:
```python
# Break the text into words
words = text_blob.words
sentences = text_blob.sentences
```

In [15]:
```python
for sentence in sentences:
    sentiment = sentence.sentiment
    polarity = sentiment.polarity
    subjectivity = sentiment.subjectivity
    print(f"Sentence: {sentence}")
    print(f"Polarity: {polarity}")  # Sentiment polarity between -1 and 1
    print(f"Subjectivity: {subjectivity}")  # Subjectivity between 0 and 1
    print()
```

Sentence: During the Iron Age, what is now metropolitan France was inhabited by t
he Gauls, a Celtic people.
Polarity: 0.0
Subjectivity: 0.0

Sentence: Rome annexed the area in 51 BC, holding it until the arrival of Germani
c Franks in 476, who formed the Kingdom of Francia.
Polarity: 0.0
Subjectivity: 0.0

Sentence: The Treaty of Verdun of 843 partitioned Francia into East Francia, Midd
le Francia and West Francia.
Polarity: 0.0
Subjectivity: 0.0

Sentence: West Francia, which became the Kingdom of France in 987, emerged as a m
ajor European power in the Late Middle Ages, following its victory in the Hundred
Years' War (1337⬜1453).
Polarity: -0.0475
Subjectivity: 0.24000000000000005

Sentence: During the Renaissance, French culture ⬜ourished and a global colonial
empire was established, which by the 20th century would become the second largest
in the world.
Polarity: 0.0
Subjectivity: 0.0

Sentence: The 16th century was dominated by religious civil wars between Catholic
s and Protestants (Huguenots).
Polarity: 0.0
Subjectivity: 0.25

Sentence: France became Europe's dominant cultural, political, and military power
in the 17th century under Louis XIV.
Polarity: 0.0
Subjectivity: 0.10000000000000002

Sentence: In the late 18th century, the French Revolution overthrew the absolute
monarchy, establishing one of modern history's earliest republics and drafting th
e Declaration of the Rights of Man and of the Citizen, which expresses the natio
n's ideals to this day.
Polarity: 0.02500000000000001
Subjectivity: 0.45

5)

```python
In [16]: import nltk
         from textblob import TextBlob

         # Attempt to translate the text into French
         translation = text_blob.translate(from_lang='en',to='fr')
         print("Translation to French:")
         print(translation)
```

Translation to French:
Pendant l'âge du fer, ce qui est maintenant métropolitain La France était habitée par les Gaulois, un peuple celtique. Rome a annexé la zone en 51 avant JC, la ten ant jusqu'à l'arrivée de Francs germaniques en 476, qui a formé le Royaume de Fra ncia. Le traité de Verdun de 843 a partagé Francia en Francia East, Middle Franci a et West Francia. West Francia, qui est devenu le royaume de France en 987, est apparu comme une puissance européenne majeure à la fin du Moyen Âge, après sa vic toire dans la guerre des centaines d'années (1337 1453). Pendant la Renaissance, la culture française ouroure et un empire colonial mondial a été établi, qui, au 20e siècle, deviendrait le deuxième plus grand au monde. Le XVIe siècle était dom iné par les guerres civiles religieuses entre catholiques et protestants (hugueno ts). La France est devenue la puissance culturelle, politique et militaire domina nte d'Europe au 17ème siècle sous Louis XIV. À la fin du XVIIIe siècle, la Révolu tion française a renversé la monarchie absolue, établissant l'une des premières r épubliques de l'histoire moderne et rédigeant la déclaration des droits de l'homm e et du citoyen, qui exprime les idéaux de la nation à ce jour.

La traduction est plutôt correcte, on a juste quelques problèmes de ponctuation mais cela est acceptable

Partie D

In [2]:
```python
import math
from textblob import TextBlob
import wikipediaapi
import string
def tf(word, blobtext):
    words = blobtext.words
    return words.count(word) / len(words)


def n_containing(word, textblob_list):
    return sum(1 for blobtext in textblob_list if word in blobtext.words)

def idf(word, textblob_list):
    return math.log(len(textblob_list) / (1 + n_containing(word, textblob_list))


def tf_idf(word, blobtext, textblob_list):
    return tf(word, blobtext) * idf(word, textblob_list)


def retrieve_wikipedia_content(page_title):
    wiki_wiki = wikipediaapi.Wikipedia('en')
    page = wiki_wiki.page(page_title)
    if page.exists():
        return page.text
    else:
        return None
```

In [3]:
```python
import requests
from bs4 import BeautifulSoup
from nltk.corpus import stopwords

topics = ["France", "Elton John", "Python", "Fox", "Isaac Newton", "Zinedine Zid
bloblist = []
# Initialize the set of stopwords
```

```python
stop_words = set(stopwords.words("english"))
# Retrieve Wikipedia content and create TextBlob objects
for topic in topics:
    try:
        url = f"https://en.wikipedia.org/wiki/{topic.replace(' ', '_')}"
        response = requests.get(url)
        if response.status_code == 200:
            soup = BeautifulSoup(response.content, 'html.parser')
            content_div = soup.find('div', {'id': 'mw-content-text'})
            paragraphs = content_div.find_all('p')
            # Find the starting point for processing paragraphs
            start_index = 0
            for i, paragraph in enumerate(paragraphs):
                paragraph_text = paragraph.get_text()
                if "coordinates:" in paragraph_text.lower():
                    start_index = i + 1
                    break
            cleaned_text = ''
            for paragraph in paragraphs[start_index:]:
                paragraph_text = paragraph.get_text()

                # Remove stopwords and convert to lowercase
                words = [word.lower() for word in paragraph_text.split() if word
                cleaned_text += " ".join(words) + "\n\n" # Add line breaks after
            bloblist.append(TextBlob(cleaned_text))
        else:
            print(f"No Wikipedia page found for '{topic}'")
    except Exception as e:
        print(f"Error retrieving Wikipedia content for '{topic}': {str(e)}")
for blob in bloblist:
    # We print only the first 500 , just to have a view => all text is to long t
    print(blob[:500])
```

– europe (green & dark grey)– european union (green)

france (french: [fʁɑ̃s]), officially french republic (french: république français e [ʁepyblik fʁɑ̃sɛz]),[14] country located primarily western europe. also includes overseas regions territories americas atlantic, pacific indian oceans,[xii] giving one largest discontiguous exclusive economic zones world. metropolitan area ext ends rhine atlantic ocean mediterranean sea english channel north sea; overseas t erritories include french guiana s

sir elton hercules john ch cbe (born reginald kenneth dwight; 25 march 1947[1]) b ritish singer, pianist composer. sold 300 million records worldwide, making one b est-selling music artists time,[2] successful solo artist history us billboard ch arts.[3] acclaimed critics musicians, particularly work 1970s lasting impact musi c industry, music showmanship significant impact popular music.[4] songwriting pa rtnership lyricist bernie taupin one successful history.[5]

john raised pinner suburb london
python may refer to:

species canini

foxes small medium-sized, omnivorous mammals belonging several genera family cani dae. flattened skull, upright, triangular ears, pointed, slightly upturned snout, long bushy tail ("brush").

twelve species belong monophyletic "true fox" group genus vulpes. approximately a nother 25 current extinct species always sometimes called foxes; foxes either par t paraphyletic group south american foxes, outlying group, consists bat-eared fo x, gray fox, island fox.[1]

foxes live every con

sir isaac newton frs (25 december 1642 – 20 march 1726/27)[a] english mathematici an, physicist, astronomer, alchemist, theologian, author described time natural p hilosopher. key figure scientific revolution enlightenment followed. pioneering b ook philosophiæ naturalis principia mathematica (mathematical principles natural philosophy), first published 1687, consolidated many previous results established classical mechanics.[17][18] newton also made seminal contributions optics, share s credit ge

zinedine yazid zidane (french: zinédine yazid zidane;[4] born 23 june 1972), popu larly known zizou, french professional football manager former player played atta cking midfielder. recently coached spanish club real madrid one successful coache s world. widely regarded one greatest players time, zidane playmaker renowned ele gance, vision, passing, ball control, technique. received many individual accolad es player, including named fifa world player year 1998, 2000 2003, winning 1998 b allon d'or.

In [4]:
```python
# Merge the list of words from all documents
merged_text = " ".join([str(blob) for blob in bloblist])
```

```
# We print only the first 500 , just to have a view => all text is to long to sh
print(merged_text[:500])
```

– europe (green & dark grey)– european union (green)

france (french: [fʁɑ̃s]), officially french republic (french: république français
e [ʁepyblik fʁɑ̃sɛz]),[14] country located primarily western europe. also includes
overseas regions territories americas atlantic, pacific indian oceans,[xii] givin
g one largest discontiguous exclusive economic zones world. metropolitan area ext
ends rhine atlantic ocean mediterranean sea english channel north sea; overseas t
erritories include french guiana s

In [5]:
```
# Number of words to apply the tfid on (Computing all words take to much time):
word_no = 20
# Sélection des 10 premiers mots
word_list = set(merged_text.split()[:word_no])
# Calculation of TF-IDF pour each word in the list
tfidf_values = []
for word in word_list:
    tfidf_value = tf_idf(word, TextBlob(merged_text), bloblist)
    tfidf_values.append((word, tfidf_value))
print(tfidf_values)
```

[('union', 0.000367335665979493), ('[fʁɑ̃s]', 0.0), ('european', 0.000346870147913
8473), ('(french:', 0.0), ('république', 9.953001346875429e-05), ('[ʁepyblik', 0.
0), ('europe', 0.0008326275095535175), ('france', 0.0021748207686661854), ('offic
ially', 9.953001346875429e-05), ('(green)', 0.0), ('française', 0.000132706684625
0057), ('(green', 0.0), ('grey)–', 0.0), (')', 0.0), ('&', 0.0), ('republic', 0.
00066982876662219197), ('–', 0.0), ('french', 0.0017343507395692365), ('dark', 3.3
17667115625143e-05)]

Partie E

In [6]:
```
#pip install tensorflow
```

In [8]:
```
import wikipedia
from textblob import TextBlob
from nltk import sent_tokenize
import pandas as pd
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt
import re

tf.compat.v1.disable_eager_execution()

corpus = []
sentences_added = 0
for blob in bloblist:
    sentences = re.split(r'(?<!\w\.\w.)(?<![A-Z][a-z]\.)(?<=\.|\?|\!)\s', str(bl
    for sentence in sentences:
        corpus.append(sentence)
        sentences_added += 1
        if sentences_added == 10:
            break
    if sentences_added == 10:
```

```
            break

print(corpus)

def remove_stop_words(corpus):
    stop_words = ['is', 'a', 'will', 'be']
    results = []
    for text in corpus:
        tmp = text.split(' ')
        for stop_word in stop_words:
            if stop_word in tmp:
                tmp.remove(stop_word)
    results.append(" ".join(tmp))

    return results

corpus = remove_stop_words(corpus)

words = []
for text in corpus:
    for word in text.split(' '):
        words.append(word)

words = set(words)

word2int = {}
for i, word in enumerate(words):
    word2int[word] = i
sentences = []

for sentence in corpus:
    sentences.append(sentence.split())
WINDOW_SIZE = 2
data = []
for sentence in sentences:
    for idx, word in enumerate(sentence):
        for neighbor in sentence[max(idx - WINDOW_SIZE, 0): min(idx + WINDOW_SIZ
            if neighbor != word:
                data.append([word, neighbor])

df = pd.DataFrame(data, columns=['input', 'label'])

ONE_HOT_DIM = len(words)

# Function to convert numbers to one-hot vectors
def to_one_hot_encoding(data_point_index):
    one_hot_encoding = np.zeros(ONE_HOT_DIM)
    one_hot_encoding[data_point_index] = 1
    return one_hot_encoding

X = [] # Input word
Y = [] # Target word

for x, y in zip(df['input'], df['label']):
    if x in word2int and y in word2int:
        X.append(to_one_hot_encoding(word2int[x]))
        Y.append(to_one_hot_encoding(word2int[y]))

# Convert them to numpy arrays
X_train = np.asarray(X)
```

```python
Y_train = np.asarray(Y)

# Create inputs for X_train and Y_train
x = tf.keras.Input(shape=(ONE_HOT_DIM,), dtype=tf.float32)
y_label = tf.keras.Input(shape=(ONE_HOT_DIM,), dtype=tf.float32)

# Word embedding will be 2 dimensions for 2D visualization
EMBEDDING_DIM = 2

# Hidden layer: represents word vectors
W1 = tf.Variable(tf.random.normal([ONE_HOT_DIM, EMBEDDING_DIM]))
b1 = tf.Variable(tf.random.normal([EMBEDDING_DIM])) # Bias
hidden_layer = tf.add(tf.matmul(x, W1), b1)

# Output layer
W2 = tf.Variable(tf.random.normal([EMBEDDING_DIM, ONE_HOT_DIM]))
b2 = tf.Variable(tf.random.normal([ONE_HOT_DIM]))
prediction = tf.nn.softmax(tf.add(tf.matmul(hidden_layer, W2), b2))

# Loss function: cross entropy
loss = tf.reduce_mean(-tf.reduce_sum(y_label * tf.math.log(prediction), axis=[1]

# Training operation
optimizer = tf.keras.optimizers.SGD(learning_rate=0.05)
# Compute gradients
variables = [W1, b1, W2, b2]
gradients = tf.gradients(loss, variables)
# Apply gradients
train_op = optimizer.apply_gradients(zip(gradients, variables))
# Initialize variables
init = tf.compat.v1.global_variables_initializer()
iteration = 20000
with tf.compat.v1.Session() as sess:
    sess.run(init)
    for i in range(iteration):
        # Input is X_train (one-hot encoded word)
        # Label is Y_train (one-hot encoded neighbor word)
        sess.run(train_op, feed_dict={x: X_train, y_label: Y_train})
        if i % 3000 == 0:
            print('Iteration ' + str(i) + ' Loss is:', sess.run(loss, feed_dict=
    # The hidden layer (W1 + b1) is the word lookup table
    vectors = sess.run(W1 + b1)
    print(vectors)
    w2v_df = pd.DataFrame(vectors, columns=['x1', 'x2'])
    w2v_df['word'] = list(words) # Convertir l'ensemble en liste
    w2v_df = w2v_df[['word', 'x1', 'x2']]
    w2v_df


import matplotlib.pyplot as plt
fig, ax = plt.subplots()
for word, x1, x2 in zip(w2v_df['word'], w2v_df['x1'], w2v_df['x2']):
    ax.annotate(word, (x1, x2))

PADDING = 1.0
x_axis_min = np.amin(vectors, axis=0)[0] - PADDING
y_axis_min = np.amin(vectors, axis=0)[1] - PADDING
x_axis_max = np.amax(vectors, axis=0)[0] + PADDING
y_axis_max = np.amax(vectors, axis=0)[1] + PADDING
plt.xlim(x_axis_min, x_axis_max)
```

```
plt.ylim(y_axis_min, y_axis_max)
plt.rcParams["figure.figsize"] = (10, 10)
# Plot the word vectors
ax.scatter(w2v_df['x1'], w2v_df['x2'], marker='o', s=30)
plt.show()
```

['\n\n\n\n– europe (green & dark grey)– european union (green)\n\nfrance (french:
[fʁɑ̃s]), officially french republic (french: république française [ʁepyblik fʁɑ̃s
ɛz]),[14] country located primarily western europe.', 'also includes overseas reg
ions territories americas atlantic, pacific indian oceans,[xii] giving one larges
t discontiguous exclusive economic zones world.', 'metropolitan area extends rhin
e atlantic ocean mediterranean sea english channel north sea; overseas territorie
s include french guiana south america, saint pierre miquelon north atlantic, fren
ch west indies, many islands oceania indian ocean.', "eighteen integral regions
(five overseas) span combined area 643,801 km2 (248,573 sq mi) total population 6
8 million january 2023[update].[5][8] france unitary semi-presidential republic c
apital paris, country's largest city main cultural commercial centre; major urban
areas include marseille, lyon, toulouse, lille, bordeaux, strasbourg nice.", '\ni
nhabited archaic humans since paleolithic era, territory metropolitan france sett
led iron age celtic tribes known gauls.', 'rome annexed area 51 bc, leading disti
nct gallo-roman culture laid foundation french language.', 'germanic franks forme
d kingdom francia, became heartland carolingian empire.', 'treaty verdun 843 part
itioned empire, west francia becoming kingdom france 987.', 'high middle ages, fr
ance powerful highly decentralised feudal kingdom.', 'philip ii successfully stre
ngthened royal power defeated rivals double size crown lands; end reign, france e
merged powerful state europe.']
Iteration 0 Loss is: 4.213395
Iteration 3000 Loss is: 4.213395
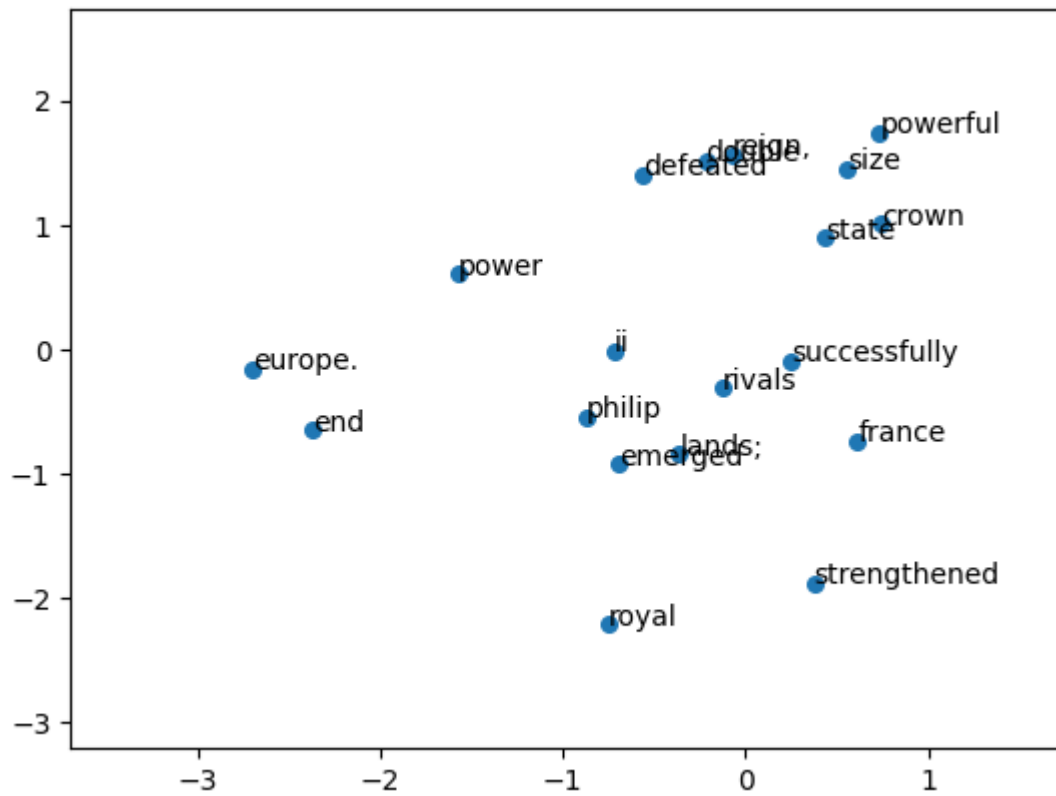Iteration 6000 Loss is: 4.213395
Iteration 9000 Loss is: 4.213395
Iteration 12000 Loss is: 4.213395
Iteration 15000 Loss is: 4.213395
Iteration 18000 Loss is: 4.213395
[[-0.21683381 1.5088974]
 [-0.06856242 1.5653872]
 [0.4309247   0.8938398]
 [0.37345392 -1.8913268]
 [-2.6951122 -0.16547608]
 [-0.75479734 -2.2150908]
 [-0.696381   -0.92956495]
 [-0.1261874 -0.31610626]
 [-0.87319595 -0.5467205]
 [0.61152256 -0.73716617]
 [0.73924637 1.003551]
 [0.7334584   1.740709   ]
 [0.5587982   1.4491415]
 [-0.7167243 -0.01770008]
 [-2.3680608 -0.6558281]
 [-1.5746284   0.6045742]
 [-0.5651329   1.4057405]
 [-0.3625394 -0.84613585]
 [0.25199944 -0.09889865]]
```

**On a des mots ayant des sens similaires qui des valeurs proches sur l'axe qui définit la similarité des mots le graphe représente donc assez bien la similarité des mots**

In [ ]: