PDF	Question	Target Answer	Score(retrieval)

The Alpha Grooming An alpha male is well-groomed – period. People say that
you shouldn't judge a book by its cover, but most of them do it anyway. It's not
a question of morality – it's just a fact as far as social norms go. If you are wellgroomed,
you can expect better treatment than those who dress like bums. For
the next 30 days, take note of the following grooming tips:
1. Always Wear Mature Clothing – Clothing and style are two of the
things that are easy to nail in order to be an alpha. The

The Alpha Posture You simply can’t pull off the alpha male part without the
proper, manly posture. Believe it or not, it can improve the way you will look
regardless of which clothes you wear or how big your waistline is. Posture alone
can also separate the chivalrous gentlemen from the unattractive guys that
women won’t touch with a 10-foot pole. Without further ado, here are the things
you need to remember for proper posture: ▪ Stand Straight – Appearing
confident and dignified is one of the main goals of having a good posture. By
standing straight, you are maximizing your height, which is an absolute must for
attracting ladies.It also works by making you appear healthier

Load Data From CSV
Machine learning algorithms need data. You can load your own data from CSV les but when
you are getting started with machine learning in Python you should practice on standard
machine learning datasets. Your task for todays lesson are to get comfortable loading data into
Python and to nd and load standard machine learning datasets. There are many excellent

sudo

The first command that we need to talk about before you start doing any of the other commands is “sudo.” Sudo basically means “super user do.” In the previous chapters, we discussed how different distributions do things slightly differently, and that every single distribution of Linux has its own quirks; its own little ways of doing things depending on what the creators are worried about. One of the things that the creators of Ubuntu Linux were worried about was security. As what we talked about before, in every Linux computer, there is a user called Root. Root is the highest level user on the computer. It is kind of like the

DNP3 (Distributed Network Protocol)
DNP3 is found in multiple deployment scenarios and industries. It is common in utilities
and is also found in discrete and continuous process systems. Like many other ICS/SCADA
protocols, it was intended for serial communication between controllers and simple IEDs.
(For more detailed information on DNP3, refer to Chapter 6.)
There is an explicit “secure” version of DNP3, but there also remain many insecure
implementations of DNP3 as well. DNP3 has placed great

This model identifies levels of operations and defines each level. The enterprise and
operational domains are separated into different zones and kept in strict isolation via an
industrial demilitarized zone (DMZ):

■ Enterprise zone

■ Level 5: Enterprise network: Corporate-level applications such as Enterprise
Resource Planning (ERP), Customer Relationship Management (CRM), document
management, and services such as Internet access and VPN entry from the outside
world exist at this level.

■ Level 4: Business planning and logistics network: The IT services exist at this
level and may include scheduling systems, material flow applications, optimization
and planning systems, and local IT services such as phone, email, printing.

Characteristics

Traditionally data was organized in file formats. DBMS was all new concepts then and all the research was done to make it to overcome all the deficiencies in traditional style of data management. Modern DBMS has the following characteristics:

- Real-world entity: Modern DBMS are more realistic and uses real world entities to design its architecture. It uses the behavior and attributes too. For example, a school database may use student as entity and their age as their attribute.
- Relation-based tables: DBMS allows entities and relations among them to form as tables. This eases the concept of data saving. A user can understand the architecture of database just by looking at table names etc.
- Isolation of data and application: A database system is

Codd's 12 Rules

Dr Edgar F. Codd did some extensive research in Relational Model of database systems and came up with twelve rules of his own which according to him, a database must obey in order to be a true relational database.

These rules can be applied on a database system that is capable of managing is stored data using only its relational capabilities. This is a foundation rule, which provides a base to imply other rules on it.

Rule 1: Information rule

This rule states that all information (data), which is stored in the database, must be a value of some table cell. Everything in a database must be stored in table formats. This information can be user data or meta-data.

Rule 2: Guaranteed Access rule

This rule states that every single data element (value) is guaranteed to be accessible logically with combination of table-name, primary-key (row value) and attribute-name (column value). No other means, such as pointers, can be used to access data.

Rule 3: Systematic Treatment of NULL values

This rule states the NULL values in the database must be given a systematic treatment. As a NULL may have several

File ownership is another important thing that we need to take note of since we
are using Vim to edit configuration files. So what do we basically mean by file
ownership? Keep in mind that most of the software that you

I used to have the feeling that everyone else in life had at one time or
another been issued instruction books on how to make life work. And I,
for some reason, wasn't there when they passed them out.
I felt a little like the Spanish poet Cesar Vallejo, who wrote, "Well, on
the day I was born, God was sick."
Still struggling in my mid-30s with a pessimistic outlook and no sense of
purpose, I voiced my frustration once to a friend of mine, Dr. Mike
Killebrew, who recommended a book to me. Until that time, I didn't
really believe that there could be a book that could tell you how to
make your life work.
page_36
Page 37
The name of the book was The Master Key to Riches by Napoleon Hill.
It sat on my shelf for quite awhile. I didn't believe in motivational books
or self-help. They were for weak and gullible fools. I was finally
persuaded to read the book by the word riches in the title. Riches would

25. Find your inner Einstein

The next time you see a picture of Albert Einstein, realize that th
actually you. See Albert Einstein and say, "there I am."

Every human has the capacity for some form of genius. You don
to be good with math or physics to experience genius level in yo
thinking. To experience Einstein's creative level of thinking, all y
have to do is habitually use your imagination.

This is a difficult recommendation for adults to follow, though, b
adults have become accustomed to using their imaginations for c
thing: worrying. Adults visualize worst-case scenarios all day lo

Main PSO variants

Just like most well-established algorithms in AI, PSO has its share of variants, most of which are better-suited for certain sets of problems. The most important of these variants are:

PSO with inertia (by Shi and Eberhart): a variation of PSO that uses an “inertia weight” (usually around 0.9), which gradually decreases, allowing for a narrowing of the search over time. This

DISTORTION

Distortion is changing an experience from what it actually is to some modified
form of what it is. (Let’s put aside whether you can really know what something

Drawing Circles

Because drawing individual lines can become tiresome, you may want to tell
Liberty BASIC to draw circles instead. To draw a circle, you can use the CIRCLE
command as in the following example:

PRINT #Windowhandle, “CIRCLE R”

Here’s what’s happening in this example:

1. The #Windowhandle portion defines the graphics window in

Saving data into a random-access file

After you go through the hassle of creating a random-access file, the next step is knowing how to stuff data into that random-access file.

To put something inside a random-access file, use the following command:

PUT #Filehandle, Recordnumber

In this example, #Filehandle represents the number that you assign to the random-access file by using the OPEN command, and Recordnumber is the order in which you want to store the data in the random-access file. (Record number 1 is the first chunk of data in the file; record number 2 is the second; and so on.)

Putting it all together, you have a program similar to the following example:

```
OPEN “a:\stuff.dat” FOR random AS #losers LEN = 25
FIELD #losers, 15 AS name$, 2 AS age$, 8 AS phone$
FOR I = 1 TO 3
PROMPT “Type a name:”; name$
PROMPT “What is this person’s age?”; age$
```

The insertion sort program works as follows:
1. The first through seventh lines create the variable MaxSize, which
equals 5; create the array MyArray to hold five integers; generate a
random number; create a random number between 1 and 100; store it in
the array MyArray; and then print the array on-screen along with the
string (Initial array).
2. The eighth line is the start of a FOR-NEXT loop that starts counting from
the second item in the array, using the variable ArrayPos.
3. The ninth line creates the variable TempValue and stores the value in
the array location that the ArrayPos variable designates. At the beginning
of this FOR-NEXT loop, the value of TempValue is equal to the
second item in the array.
4. The tenth line creates the variable StopNow and sets its value to zero.
You use the StopNow variable later in the program to tell the computer
that it's already moved a number to its correctly sorted position in the
array.
5. The eleventh line creates the variable Count and sets its value to one.
You use the Count variable to locate where in the array to move the
number that the TempValue variable stores.

2.1 Models
RAG-Sequence Model The RAG-Sequence model uses the same retrieved document to generate
the complete sequence. Technically, it treats the retrieved document as a single latent variable that

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Score(Hybrid search) Retrieval Response Form Dense Embedding

[Document(page_content='conscious. There are also those who are not yet in touch of their true talents and\nabilities during the early developmental stages of their social life, specifically in\nschool. Ironically, this is usually the time when they needed to show off the most\n \nGet Your Free Bonus Gift\nClick Here to Download Your Free Gift\nimportant especially when having conversations. It makes you appear\nmore respectablewhile also helping you look and feel more confident.\nJust remember to keep your head level and maintain eye contact whilst\nconversing. Do this for 30 days. You should also consider “practice”\nyour posture at home in front of the mirror. \nThe Alpha Grooming An alpha male is well-groomed – period. People say that\nyou shouldn’t judge a book by its cover, but most of them do it anyway. It’s not\na question of morality – it’s just a fact as far as social norms go. If you are well-\ngroomed, you can expect better treatment than those who dress like bums. For\nthe next 30 days, take note of the following grooming tips:\n1. Always Wear Mature Clothing – Clothing and style are two of the\nthings that are easy to nail in order to be an alpha. The first rule is to\nalways be appropriate. Never overdress or underdress for absolutely\nall occasions. Additionally, mind your choice of clothes. Avoid shirts\nwith profane or immature designs and aim for simple yet stylish. \nWhen in doubt, go for darker shades and neutral colors since

[Document(page_content='days, practice centering your weight to the middle portion of your feet. Lift up\nyour chest, keep your shoulders aligned, and stick your butt out.\n▪ Sitting Straight –A lot of people actually find it more difficult to\nmaintain posture while sitting than when standing. The first reason is\nbecause people think they can get away with an improper sitting posture\neasily. Secondly, people generally spend more time sitting that they seem\nto fail to maintain the proper sitting posture most of the time. For 30\ndays,be actively conscious of your spine and see to it that it's always\nstraight while sitting. When working for prolonged periods, set a\nrecurring alarm every 15-30 minutes to remind yourself to straighten\nyour posture.\n▪ Chin Up – The next component of the alpha posture is extremely\n4. Character – Can you identify the positive aspects of your own\ncharacter? Do you consider yourself as a persevering professional,\na lifelong learner, or a person with principles? Remember that the\npositive things in your character will earn you respect. \nRemember; you can use these strengths to build your self-confidence by\nexercising them and accomplishing something. By the end of this chapter, you\nwill set goals for yourself and perform other activities during the first week that\nget you started on the right track. There is just one last thing you need to\nunderstand before you do so.\nDealing with your Weaknesses Even the alphas are not perfect. Every single\nperson in this world is lacking in certain departments whether they can improve\nthem or not. Some are superficial while some are embedded on a person's way\nof living or mindset. But whatever your weakness is, you will do well in\nacknowledging them completely and understanding how you can turn them into\nreal opportunities.\nKeep in mind that an alpha male is a student of life – a lifelong learner. They\ncan spot their imperfections and somehow turn them into challenges to make life'), Document(page_content='colleagues by identifying their strengths and encouraging them to\ntake advantage of it.\n2. Being Financially Sound – An alpha male knows his way around\nmoney. Another rule in dating is to always pay for the food. So you\nhave to make sure you always have an extra saved for a rainy day.\nFor the next 30 days, save at least $10 per day by cutting expenses or\nfinding opportunities for additional income. Also try to invest in your\nknowledge when it comes to investments.\nChapter 3 – Looking the Part\n\nYou may have integrated the alpha

[Document(page_content="4\nLesson 3: Load Data From CSV\n5\nLesson 4: Understand Data with Descriptive Statistics\n6\nLesson 5: Understand Data with Visualization\n7\nLesson 6: Prepare For Modeling by Pre-Processing Data\n8\nLesson 7: Algorithm Evaluation With Resampling Methods\n9\nLesson 8: Algorithm Evaluation Metrics\n10\nLesson 9: Spot-Check Algorithms\n11\nLesson 10: Model Comparison and Selection\n12\nLesson 11: Improve Accuracy with Algorithm Tuning\n14\nLesson 12: Improve Accuracy with Ensemble Predictions\n15\nLesson 13: Finalize And Save Your Model\n16\nLesson 14: Hello World End-to-End Project\n17\nFinal Word Before You Go...\n18\nii\nLesson 3: Load Data From CSV\nMachine learning algorithms need data. You can load your own data from CSV files but when\nyou are getting started with machine learning in Python you should practice on standard\nmachine learning datasets. Your task for todays lesson are to get comfortable loading data into\nPython and to find and load standard machine learning datasets. There are many excellent\nstandard machine learning datasets in CSV format that you can download and practice with on\nthe UCI machine learning repository5.\n\x88 Practice loading CSV files into Python using the CSV.reader()6 function in the standard\nlibrary.\n\x88 Practice loading CSV files using NumPy and the numpy.loadtxt()7 function.\n\x88 Practice loading CSV files using Pandas and the pandas.read csv()8 function.\nTo get you started, below is a snippet that will load the Pima Indians onset of diabetes\ndataset using Pandas directly from the UCI Machine Learning Repository.\n1\n# Load CSV using Pandas from URL\n2\nfrom pandas import read_csv\n3\nurl = 'https://goo.gl/bDdBiA'\n4\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n5\ndata = read_csv(url, names=names)\n6\nprint(data.shape)\nListing 3: Load a CSV dataset from a URL.\nWell done for making it this far! Hang in there.\n5http://archive.ics.uci.edu/ml/\n6https://docs.python.org/2/library/csv.html"), Document(page_content="dataset using Pandas directly from the UCI Machine Learning Repository.\n1\n# Load CSV using Pandas from URL\n2\nfrom pandas import read_csv\n3\nurl = 'https://goo.gl/bDdBiA'\n4\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n5\ndata = read_csv(url, names=names)\n6\nprint(data.shape)\nListing 3: Load a CSV dataset from a URL.\nWell done for making it this far! Hang in there.\n5http://archive.ics.uci.edu/ml/\n6https://docs.python.org/2/library/csv.html\n7http://docs.scipy.org/doc/numpy-1.10.0/reference/generated/numpy.loadtxt.html\n8http://pandas.pydata.org/pandas-docs/stable/generated/pandas.read_csv.html\n5\n\n\x01\x02\x03\x04\x05\x06\x07\x08\t\x07\x02\n\x06\x05\x06

[Document(page_content="https://machinelearningmastery.com/machine-learning-with-python/\n1http://MachineLearningMastery.com\nLesson 6: Prepare For Modeling by\nPre-Processing Data\nYour raw data may not be setup to be in the best shape for modeling. Sometimes you need to\npre-process your data in order to best present the inherent structure of the problem in your\ndata to the modeling algorithms. In today's lesson, you will use the pre-processing capabilities\nprovided by the scikit-learn.\nThe scikit-learn library provides two standard idioms for transforming data. Each are useful\nin different circumstances: Fit and Multiple Transform and Combined Fit-And-Transform.\nThere are many techniques that you can use to prepare your data for modeling, for example try\nout some of the following:\n\x88 Standardize numerical data (e.g. mean of 0 and standard deviation of 1) using the scale\nand center options.\n\x88 Normalize numerical data (e.g. to a range of 0-1) using the range option.\n\x88 Explore more advanced feature engineering such as Binarizing.\nFor example, the snippet below loads the Pima Indians onset of diabetes dataset, calculates\nthe parameters

[Document(page_content='features are “on.” For instance, out of a vocabulary of 10, 000 or\n100, 000 words, a given document probably only contains about 100.\nFrom a storage and computation perspective, this is very useful.\nHowever, after centering, the data will no longer sparse and you will\npay dearly with outrageously slow implementations.\nFigure 4.11: prac:exnorm: example of\nexample normalization\nIn example normalization, you view examples one at a time. The\nmost standard normalization is to ensure that the length of each\nexample vector is one: namely, each example lies somewhere on the\nunit hypersphere. This is a simple transformation:\nExample Normalization:\nxn ←xn/ ||xn||\n (4.7)\nThis transformation is depicted in Figure 4.11.\nThe main advantage to example normalization is that it makes\ncomparisons more straightforward across data sets. If I hand you\ntwo data sets that differ only in the norm of the feature vectors (i.e.,\nDraft:\nDo Not\nDistribute\n62\na course in machine learning\nAlgorithm 9 KNN-Train-LOO(D)\n1: errk ←0, ∀1 ≤k ≤N −1\n// errk stores how well you do with kNN\n2: for n = 1 to N do\n3:\nSm ←⟨||xn −xm|| , m⟩, ∀m ̸= n\n// compute distances to other points\n4:\nS ←sort(S)\n// put lowest-distance objects first\n5:\nˆ \nny ←0\n// current label prediction\n6:\nfor k = 1 to N −1 do\n7:\n⟨dist,m⟩←Sk\n8:\nˆ \ny ←ˆ \ny + ym\n// let kth closest point vote\n9:\nif ˆ \ny ̸= ym then\n10:\nerrk ←errk + 1\n// one more error for kNN\n11:\nend if\n12:\nend for\n13: end for\n14: return aargmink errk\n// return the K that achieved lowest error\nment data is robustness. The main advantage of development data is\nspeed.\nOne warning to keep in mind is that the goal of both cross valida-\ntion and development data is to estimate how well you will do in the\nfuture. This is a question of statistics, and holds only if your test data\nreally looks like your training data. That is, it is drawn from the same\ndistribution. In many practical cases, this is not entirely true.\nFor example, in person identification, we might try to classify'), Document(page_content='inition is to look for features with low variance.

[Document(page_content='type?” That is actually the weird thing about Linux. They expect you, as the system\nadministrator, to know what that file is. So if you are going to modify text files,\nunderstand that they are not going to have .txt file extensions. It will just be the\nfilename. You must understand what file it is you need to modify first before you\nuse a file editor software to edit that file.\nAll the configuration files in Linux have to be edited using a file editor. If you do\nnot understand how to edit documents or text in Linux, you are not going to get\nanywhere.\nSudo\nThe first command that we need to talk about before you start doing any of the\nother commands is “sudo.” Sudo basically means “super user do.” In the previous\nchapters, we discussed how different distributions do things slightly differently,\nand that every single distribution of Linux has its own quirks; its own little ways of\ndoing things depending on what the creators are worried about.\nOne of the things that the creators of Ubuntu Linux were worried about was\nsecurity. As what we talked about before, in every Linux computer, there is a user\ncalled Root. Root is the highest level user on the computer. It is kind of like the\nadministrator in a Microsoft Windows computer.\nJust like on a Windows computer, if somebody logged in as the administrator, or\nsomebody logged in as root on Linux, they can do absolutely anything they want to\nthat computer. They can install viruses, malware, or spyware, or basically just\ncause a lot of havoc. Hackers, using special programs and scripts, can also try to\nlogin as Root and cause all these problems.\nTo alleviate the possibility of a hacker obtaining root access, the Ubuntu creators\ndecided they never want anybody to login straight as Root. So in Ubuntu Linux,\nyou cannot login as the user Root.\nNow, here comes the problem. Since you cannot login as Root, how do you do all\nthese administrative tasks then? How do you execute administrative processes?')]

[Document(page_content='resilient network design, 286–289\nwireless networks, 289–293\nCSMA/CA (Collision Sense Multiple \nAccess/Collision Avoidance), 108\ncurrent differential protection, \n364–365\nD\nDAG (directed acyclic graph), 168–169\ndaisy-chaining links, 470\nDASH7\n, 117–118\ndata abstraction layer (IoT Reference \nModel), 38\ndata accumulation layer (IoT \nReference Model), 38\ndata aggregation in WSNs, 90–91\ndata analytics\nbig data\ncharacteristics of, 220–222\nHadoop, 224–230\nMPP databases, 222–223\nNoSQL, 223–224\nbusiness benefits, 61–62\nchallenge of, 23, 30, 32, 206–207\n, \n211–212\ndata in motion versus data at rest, \n209\ndistributed analytics systems, \n235–236\nedge streaming analytics\nin automobile racing, 230–231\nbig data versus, 231–232\ncore functions, 232–235\nmachine learning, 212\nartificial intelligence in, 212–213\nIoT applications for, 218–220\n252 Chapter 8: Securing IoT\nDNP3 (Distributed Network Protocol)\nDNP3 is found in multiple deployment scenarios and industries. It is common in \nutilities \nand is also found in discrete and continuous process systems. Like many other ICS/SCADA \nprotocols, it was intended for serial communication between controllers and simple IEDs. \n(For more detailed information on DNP3, refer to Chapter 6.)\nThere is an explicit “secure” version of DNP3, but there also remain many insecure \n \nimplementations of DNP3 as well. DNP3 has placed great emphasis on the reliable \n \ndelivery of messages. That emphasis, while normally highly desirable, has a specific \n \nweakness from a security perspective. In the case of DNP3, participants allow for \n \nunsolicited responses, which could trigger an undesired response. The missing security \nelement here is the ability to establish trust in the system’s state and thus the ability to \ntrust the veracity of the information being presented. This is akin to the security flaws \npresented by Gratuitous ARP messages in Ethernet networks, which has been addressed \nby Dynamic ARP Inspection (DAI) in modern Ethernet switches.'), Document(page_content='management, and services such as Internet access and VPN entry from the out-\nside world exist at this level.\n \n■Level 4: Business planning and logistics network: The IT services exist at this \nlevel and may include scheduling systems, material flow applications, optimiza-\ntion and planning systems, and local IT services such as phone, email, printing, \nand security monitoring.\n \n■Industrial demilitarized zone\n \n■DMZ: The DMZ provides a buffer zone where services and data can be shared \nbetween the operational and enterprise zones. It also allows for easy segmenta-\ntion of organizational control. By default, no traffic should traverse the DMZ; \neverything should originate from or terminate on this area.\n \n■Operational zone\n \n■Level 3: Operations and control: This level includes the functions involved in \nmanaging the workflows to

[Document(page_content='management, and services such as Internet access and VPN entry from the out-\nside world exist at this level.\n \n■Level 4: Business planning and logistics network: The IT services exist at this \nlevel and may include scheduling systems, material flow applications, optimiza-\ntion and planning systems, and local IT services such as phone, email, printing, \nand security monitoring.\n \n■Industrial demilitarized zone\n \n■DMZ: The DMZ provides a buffer zone where services and data can be shared \nbetween the operational and enterprise zones. It also allows for easy segmenta-\ntion of organizational control. By default, no traffic should traverse the DMZ; \neverything should originate from or terminate on this area.\n \n■Operational zone\n \n■Level 3: Operations and control: This level includes the functions involved in \nmanaging the workflows to produce the desired end products and for monitor-\ning and controlling the entire operational system. This could include production \nscheduling, reliability assurance, systemwide control optimization, security man-\nagement, network management, and potentially other required IT services, such as \nDHCP, DNS, and timing.\n \n■Level 2: Supervisory control: This level includes zone control rooms, controller \nstatus, control system network/application administration, and other control-\nrelated applications, such as human-machine interface (HMI) and historian.\n \n■Level 1: Basic control: At this level, controllers and IEDs, dedicated HMIs, and \nother applications may talk to each other to run part or all of the control function.\n \n■Level 0: Process: This is where devices such as sensors and actuators and \nmachines such as drives, motors, and robots communicate with controllers or IEDs.\n \n■Safety zone\n \n■Safety-critical: This level includes devices, sensors, and other equipment used to \nmanage the safety functions of the control system.\nOne of the key advantages of designing an industrial network in structured levels, as'), Document(page_content='by network engineering groups. Finding network professionals with experience performing \nsuch functions or even training those without prior experience is not difficult.\nAnother security practice that adds value to a networked industrial space is conver-\ngence, which is the adoption and integration of security across operational boundaries. \nThis means coordinating security on both the IT and OT sides of the organization. \nConvergence of the IT

[Document(page_content='Duplicate tuples are automatically eliminated. \n \nTUTORIALS POINT \nSimply Easy Learning \nPage 7 \n \nDBMS Overview \nDatabase is collection of data which is related by some aspect. Data is collection of facts and figures \nwhich can be processed to produce information. Name of a student, age, class and her subjects can be \ncounted as data for recording purposes. \nMostly data represents recordable facts. Data aids in producing information which is based on facts. For \nexample, if we have data about marks obtained by all students, we can then conclude about toppers and \naverage marks etc. \nA database management system stores data, in such a way which is easier to retrieve, manipulate and helps \nto produce information. \nCharacteristics \nTraditionally data was organized in file formats. DBMS was all new concepts then and all the research was \ndone to make it to overcome all the deficiencies in traditional style of data management. Modern DBMS has \nthe following characteristics: \n\uf0b7 \nReal-world entity: Modern DBMS are more realistic and uses real world entities to design its architecture. \nIt uses the behavior and attributes too. For example, a school database may use student as entity and \ntheir age as their attribute. \n\uf0b7 \nRelation-based tables: DBMS allows entities and relations among them to form as tables. This eases the \nconcept of data saving. A user can understand the architecture of database just by looking at table names \netc. \n\uf0b7 \nIsolation of data and application: A database system is entirely different than its data. Where database \nis said to active entity, data is said to be passive one on which the database works and organizes. DBMS \nalso stores metadata which is data about data, to ease its own process. \n\uf0b7 \nLess redundancy: DBMS follows rules of normalization, which splits a relation when any of its attributes \nis having redundancy in values. Following normalization, which itself is a mathematically rich and scientific'), Document (page_content='Users \nDBMS is used by various users for various purposes. Some may involve in retrieving data and some may \ninvolve in backing it up. Some of them are described as follows: \n \n \n \n[Image: DBMS Users] \n\uf0b7 \nAdministrators: A bunch of users maintain the DBMS and are responsible for administrating the \ndatabase. They are responsible to look after its usage and by whom it should be used. They create users \naccess and apply limitation to maintain isolation and force security. Administrators also look after DBMS \nresources like system license, software

[Document(page_content="This makes it easier for the programmer to concentrate on what she is programming. Details of entities are \ngenerally hidden from the user, this process known as abstraction. \nOne of the important features of Generalization and Specialization, is inheritance, that is, the attributes of \nhigher-level entities are inherited by the lower level entities. \n \n \n[Image: Inheritance] \nFor example, attributes of a person like name, age, and gender can be inherited by lower level entities like \nstudent and teacher etc. \nTUTORIALS POINT \nSimply Easy Learning \nPage 14 \n \nDatabase schema can be divided broadly in two categories: \n\uf0b7 \nPhysical Database Schema: This schema pertains to the actual storage of data and its form of storage \nlike files, indices etc. It defines the how data will be stored in secondary storage etc. \n\uf0b7 \nLogical Database Schema: This defines all logical constraints that need to be applied on data stored. It \ndefines tables, views and integrity constraints etc. \nDatabase Instance \nIt is important that we distinguish these two terms individually. Database schema is the skeleton of database. It \nis designed when database doesn't exist at all and very hard to do any changes once the database is \noperational. Database schema does not contain any data or information. \nDatabase instances, is a state of operational database with data at any given time. This is a snapshot of \ndatabase. Database instances tend to change with time. DBMS ensures that its every instance (state) must be \na valid state by keeping up to all validation, constraints and condition that database designers has imposed or \nit is expected from DBMS itself. \nTUTORIALS POINT \nSimply Easy Learning \nPage 63 \n \nFor a hash function to work efficiently and effectively the following must match: \n\uf0b7 \nDistribution of records should be uniform \n\uf0b7 \nDistribution should be random instead of any ordering \nDynamic Hashing"), Document(page_content="the data is organized

[Document(page_content="Generalization
\n..... 26 \nSpecialization
\n..... 26 \nInheritance
..... 27 \nCodd's 12 Rules
\n..... 28 \nRule 1: Information
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constraints and condition that database designers has imposed or \nit is
expected from DBMS itself. \nTUTORIALS POINT \nSimply Easy

<QueryDict: {'prompt': ['how To Changing File Ownership?'], 'Api_choice': ['Pdf'], 'model_choice': ['OPENAI']}>
[Document(page_content='exception of typing start instead of stop at the end.\nChanging File Ownership\nFile ownership is another important thing that we need to take note of since we\nare using Vim to edit configuration files. So what do we basically mean by file\nownership? Keep in mind that most of the software that you install on your Linux\nsystem came from their respective developers. In other words, they came from an\nexternal source. When you install them onto your Linux system, the ownership of\nall of the files of that software technically still falls on the developer.\nNow, here is the problem: In Linux, you cannot edit any file unless you are the\nowner of that file. For example, when you install Apache2, mySQL, or PHP on\nyour Linux web server, all the files associated with that software is owned by root\nof the source of the file. If you try to go in and edit some of those files, many times\nyou will not be able to edit them because you are not the owner.\nSo, if you are going to edit configuration files, the first thing that you ought to do is\nchange the ownership from whoever it is to you, just to make your life easy. To do\nthat, you simply type in this command:\n$ sudo chown <username> <filename>\nThe username in the above command pertains to the name of the user that you\nwant to change to the permission to. Filename, on the other hand, pertains to the\nname of the file

[Document(page_content='playing by my bed as I went to sleep each night. Everything I had\nlearned in school, in college, and from my family and friends was out\nthe window. Without fully understanding it, I was engaging in the\nprocess of completely rebuilding my own thinking. I was, thought by\nthought, replacing the old cynical and passive orientation to life with a\nnew optimistic and energetic outlook.\nSo, what is this master key to riches?\n"The great master key to riches," said Hill, "is nothing more or less than\nthe self-discipline necessary to help you take full and complete\npossession of your own mind. Remember, it is profoundly significant\nthat the only thing over which you have complete control is your own\nmental attitude."\nTaking complete possession of my own mind would be a lifelong\nadventure, but it was one that I was excited about beginning.\npage_37\nPage 38\nMaybe Hill\'s book will not be your own master key, but I promise you\nthat you\'ll find an instruction book on how to make your life work if you\nkeep looking. It might be The Power of

[Document(page_content='Combining allows you to achieve two or more objectives at once.\nFor example, as I plan my day today, I notice that I need to shop for my\nfamily after work. That\'s a task I can\'t avoid because we\'re running out\nof everything. I also note that one of my goals is to finish reading my\nmake a choice makes a choice."\npage_59\nPage 60\n25. Find your inner Einstein\nThe next time you see a picture of Albert Einstein, realize that that\'s\nactually you. See Albert Einstein and say, "there I am."\nEvery human has the capacity for some form of genius. You don\'t have\nto be good with math or physics to experience genius level in your\nthinking. To experience Einstein\'s creative level of thinking, all you\nhave to do is habitually use your imagination.\nThis is a difficult recommendation for adults to follow, though, because\nadults have become accustomed to using their imaginations for only one\nthing: worrying. Adults visualize worst-case scenarios all day long. All\ntheir energy for

[Document(page_content="of values divided by the number of values: \nThe variance measures how far a set of numbers is spread out. A variance of\nzero shows that all the values are equal; a small variance indicates that the data\npoints tend to be very close to the mean and therefore to each other, while a high\nvariance indicates that the data points are more spread out. Variance is always\npositive. Given a random variable \n the variance is defined as \nThe covariance is a measure of how much two random variables change\ntogether. Mathematically: \nCode\nimport numpy as np x = np.array([[0, 2], [1, 1], [2, 0]]).T\nprint np.mean(x[1,]) print np.var(x[1,]) print np.cov(x) 1.0\n0.666666666667\n[[1. -1.]\n[-1. 1.]]\nbecause we count each occurrence as pairs (words, 1). Then a reduceByKey()\noperation allows to aggregate each word and sum the occurrences. Again pretty\nsimple: one single line in Spark using a functional programming style. The third\ncode segment introduces accumulators and broadcast variables \nCode\n# map reduce textFile map(lambda

[Document(page_content='have a unique minimum and this minimum can be analytically derived[18].\nThis minimization task error can be formally expressed as \n where the\nobjective function has the following form: \nwhere \n are the training examples, is the vector of true labels and \n is a set of weights which are algorithmically computed in such a way that\nthe error of the model learned from the training data is minimized. This error is\nexpressed by a well-chosen loss function\n (see next question for few\nexamples).\nThis method is called “linear” because prediction is a linear combination of w\nand x, computed with a simple vector multiplication \n, and \n is a\nfunction of and .\nThe factor \n is introduced also to control the complexity of this model. In turn\nthe regularization hyper-parameter \n balances the trade-off between the goal\nof minimizing the loss function and the goal of minimizing the model\ncomplexity. For instance, it could be sometimes better to have a slightly more\nexpensive model in terms of loss function costs, if the model is simpler from the\n \n \nA collection of Data Science Interview\nQuestions Solved in Python and Spark\n \nHands-on Big Data\nand Machine Learning\n(volume I)\n \nAntonio Gulli\nan abstract from Spark API \n24 HOW IS IT

[Document(page_content='velocity of a particle for any given dimension is limited to Vmax (another\nparameter set by the user) to avoid the particles swarming out of control\n(something that would destabilize the whole process). The exact value of\nthis parameter depends on the problem.\nOther parameters include the number of particles (usually at least 20, with\nmore complex problems usually requiring more particles), the range of the\nvalues of the particles (which is dependent on the problem), and the\nstopping conditions—namely the total number of iterations and the\nminimum error threshold. These stopping conditions are also dependent on\nthe problem.\nTo make PSO faster, we can include an additional parameter that affects\nthe progress the algorithm makes as it searches through the solution space.\nIf a certain number of iterations take place without any significant\nprogress in the objective function, then the algorithm can terminate; in\nthese cases, the swarm usually has gotten stuck in a local optimum.\nMain PSO variants\nJust like most well-established algorithms in AI, PSO has its share of\nvariants, most of which are better-suited for certain sets of problems. The\nmost important of these variants are:\nPSO with inertia (by Shi and Eberhart): a variation of PSO that\nuses an “inertia weight” (usually around 0.9), which gradually\ndecreases, allowing for a narrowing of the search over time. This\nenables PSO to switch from exploratory to exploitative mode,\nyielding more accurate solutions.\nPSO with Neighborhood Operator (by Suganthan): a popular\nvariant of PSO that considers other particles in the same\nneighborhood. The idea is that through this method the chances of\ngetting trapped in a local optimum are greatly reduced, making the\nwhole system more robust.\nDiscrete PSO (by Kennedy and Eberhart): a variant of PSO that\nenables the solution of discrete optimization problems.\nConstriction PSO (by Clerc and Kennedy): a version of PSO that'),

[Document(page_content='After you have a thought, you have a response. Maybe it’s a funny feeling,\nfollowed by a comment like “This guy is nuts,” or some other internal dialogue,\npicture, or feeling.\nAll and each of us operate this way, and yet each of us is distinctively different\nAnother example is when you’re looking for someone in a crowd, you’re\nfocusing on specific things and you’re deleting the background. You might scan\na group of people searching only for a certain thing—the color of a sweater, the\nshape of a hat, or long blond hair—everything else in the picture is just\nbackground; you’ve deleted the other elements.\nDISTORTION\nDistortion is changing an experience from what it actually is to some modified\nform of what it is. (Let’s put aside whether you can really know what something\nis and just explore distortion further.) Distortion, too, is natural. We perceive and\nremember people, things, and events based on aspects of the experience; the\ntypical dog, the

[Document(page_content='PRINT #main, “COLOR green”\nPRINT #main, “GO 35; TURN 90; UP; GO 35; TURN 90”\nPRINT #main, “COLOR pink”\nPRINT #main, “DOWN; go 35”\nPRINT #main, “FLUSH”\nPRINT #main, “trapclose [quit]”\nWAIT\n[quit]\nCONFIRM “Are you sure you want to quit?”; quit$\nIF quit$ = “no” THEN WAIT\nCLOSE #main\nEND\nDrawing Circles\nBecause drawing individual lines can become tiresome, you may want to tell\nLiberty BASIC to draw circles instead. To draw a circle, you can use the CIRCLE\ncommand as in the following example:\nPRINT #Windowhandle, “CIRCLE R”\nHere’s what’s happening in this example:\n1. The #Windowhandle portion defines the graphics window in which the\ncircle that turtle graphics draws appears.\n2. The CIRCLE R command tells the computer to draw a circle, at the cur-\nrent position of the turtle (pen), with a radius that R defines, where R is\na number such as 35 or 90.\nIf you want to draw your circle in a specific color, you can use the COLOR\ncommand prior to

[Document(page_content="27\n555-6000\nDoug Bentley\n45\n555-0001\nJune Davidson\n23\n555-1002\nDonald Soons\n32\n555-5533\nJan Davis\n31\n555-4444\nField 1\nField 2\nField 3\nField 4\nField 5\nField 6\nText files can't tell where\none chunk of data ends\nand another begins.\nRandom access files store data\nin separate fields for easy\nretrieval later.\nFigure 13-1:\nText files\nstore data\nsequentially\nfrom start \nto finish, \nwhereas\nrandom-\naccess files\nstore data \nin discrete\nchunks.\n181\nChapter 13: Saving and Retrieving Stuff in Files\nBecause text files contain only letters, numbers, and symbols, you can share\ntext files among different computers, such as any computer running Windows,\nLinux, or the Macintosh operating system. If you use the Save As command in\nyour favorite word processor, you find an option to save your document as a\ntext file. Just remember that saving a word-processing document as a text file\nremoves all the document’s formatting, such as underlining or special fonts.\nCreating a new text file\nBefore you can store any data in a text file, you (obviously) must

[Document(page_content='IF (StopNow = 1) OR (Count = ArrayPos) THEN\nTime2Stop = 1\nEND IF\nWEND\nNEXT ArrayPos\nFOR I = 1 TO MaxSize\nPRINT MyArray(I); SPACE$(1);\nNEXT I\nPRINT “(Sorted array)”\nEND\nA typical output for this program appears as follows:\n44 4 98 99 26 (Initial array)\n4 44 98 99 26\n4 26 44 98 99\n4 26 44 98 99)Sorted array)\nThe insertion sort program works as follows:\n1. The first through seventh lines create the variable MaxSize, which\nequals 5; create the array MyArray to hold five integers; generate a\nrandom number; create a random number between 1 and 100; store it in\nthe array MyArray; and then print the array on-screen along with the\nstring (Initial array).\n2. The eighth line is the start of a FOR-NEXT loop that starts counting from\nthe second item in the array, using the variable ArrayPos.\n3. The ninth line creates the variable TempValue and stores the value in\nthe array location that the ArrayPos variable designates. At the begin-\nning of this FOR-NEXT loop, the value of TempValue is equal to the\nsecond item in the array.\n4. The tenth line creates the variable StopNow and sets its value to zero.\nYou use the StopNow variable later in the program to tell the computer\nthat it’s already moved a number to its correctly sorted position in the\narray.\n5. The eleventh line creates the variable Count and sets its value to one.\nYou use the Count variable to locate where in the array to move the\nnumber that the TempValue variable stores.\n6. The twelfth line creates the variable Time2Stop and sets its value to\nzero. You use the Time2Stop variable to tell the program when the array\nis completely sorted.\n7. The thirteenth line is the start of a WHILE-WEND statement that checks\nwhether the value that the Time2Stop variable stores is still equal to\nzero. If so, all the instructions inside the WHILE-WEND statements run.\nFigure 20-5:\nLiberty\nBASIC’s\nbuilt-in\nSORT\ncommand\ncan sort an\narray\nquickly and\neasily with a\nminimum\namount of\nextra code.\n285\nChapter 20: Sorting\nChapter 20\nSorting'), Document (page_content='Subprogram A\nSubprogram A messes\nup data used

[Document(page_content='to the user’s query. These articles, combined with the original\nquestion, form a comprehensive prompt that empowers LLMs\nto generate a well-informed answer.\nThe RAG research paradigm is continuously evolving, and\nwe categorize it into three stages: Naive RAG, Advanced\nRAG, and Modular RAG, as showed in Figure 3. Despite\nRAG method are cost-effective and surpass the performance\nof the native LLM, they also exhibit several limitations.\nThe development of Advanced RAG and Modular RAG is\na response to these specific shortcomings in Naive RAG.\nA. Naive RAG\nThe Naive RAG research paradigm represents the earli-\nest methodology, which gained prominence shortly after the\n18\n[44] B. Wang, W. Ping, P. Xu, L. McAfee, Z. Liu, M. Shoeybi, Y. Dong,\nO. Kuchaiev, B. Li, C. Xiao et al., “Shall we pretrain autoregressive\nlanguage models with retrieval? a comprehensive study,” arXiv preprint\narXiv:2304.06762, 2023.\n[45] B. Wang, W. Ping, L. McAfee, P. Xu, B. Li, M. Shoeybi, and B. Catan-\nzaro, “Instructretro: Instruction tuning post retrieval-augmented pre-\ntraining,” arXiv preprint arXiv:2310.07713, 2023.\n[46] S. Siriwardhana, R. Weerasekera, E. Wen, T. Kaluarachchi, R. Rana, \nand S. Nanayakkara, “Improving the domain adaptation of retrieval\naugmented generation (rag) models for open domain question answer-\ning,” Transactions of the Association for Computational Linguistics,\nvol. 11, pp. 1–17, 2023.\n[47] Z. Yu, C. Xiong, S. Yu, and Z. Liu, “Augmentation-adapted retriever\nimproves generalization of language models as generic plug-in,” arXiv\npreprint arXiv:2305.17331, 2023.\n[48] O. Yoran, T. Wolfson, O. Ram, and J. Berant, “Making retrieval-\naugmented language models robust to irrelevant context,” arXiv\npreprint arXiv:2310.01558, 2023.\n[49] H.-T. Chen, F. Xu, S. A. Arora, and E. Choi, “Understanding re-\ntrieval augmentation for long-form question answering,” arXiv preprint\narXiv:2310.12150, 2023.\n[50] W. Yu, H. Zhang, X. Pan, K. Ma, H. Wang, and D. Yu, “Chain-of-note:'), Document(page_content='yet it has not been accompanied by a systematic

[Document(page_content='and Sentence pairs [38]. Detailed information is illustrated in\nTable I.\nB. Indexing Optimization\nIn the Indexing phase, documents will be processed, seg-\nmented, and transformed into Embeddings to be stored in a\nvector database. The quality of index construction determines\nwhether the correct context can be obtained in the retrieval\nphase.\n1) Chunking Strategy: The most common method is to split\nthe document into chunks on a fixed number of tokens (e.g.,\n100, 256, 512) [88]. Larger chunks can capture more context,\nbut they also generate more noise, requiring longer processing\ntime and higher costs. While smaller chunks may not fully\nconvey the necessary context, they do have less noise. How-\never, chunks leads to truncation within sentences, prompting\nthe optimization of a recursive splits and sliding window meth-\nods, enabling layered retrieval by merging globally related\ninformation across multiple retrieval processes [89]. Never-\ntheless, these approaches still cannot strike a balance between\nsemantic completeness and context length. Therefore, methods\nlike Small2Big have been proposed, where sentences (small)\nare used as the retrieval unit, and the preceding and following\nsentences are provided as (big) context to LLMs [90].\n2) Metadata Attachments: Chunks can be enriched with\nmetadata information such as page number, file name, au-\nthor,category timestamp. Subsequently, retrieval can be filtered\nbased on this metadata, limiting the scope of the retrieval.\nAssigning different weights to document timestamps during\nretrieval can achieve time-aware RAG, ensuring the freshness\nof knowledge and avoiding outdated information.\nIn addition to extracting metadata from the original doc-\numents, metadata can also be artificially constructed. For\nexample, adding summaries of paragraph, as well as intro-\nducing hypothetical questions. This method is also known as\nReverse HyDE. Specifically, using LLM to generate questions'), Document(page_content='Token-Elimination [52]\nWikipedia\nText\nChunk\nInference\nOnce\nPaperQA [53]\nArxiv, Online Database,\nPubMed\nText\nChunk\nInference\nIterative\nNoiseRAG [54]\nFactoidWiki\nText\nChunk\nInference\nOnce\nIAG [55]\nSearch Engine,Wikipedia\nText\nChunk\nInference\nOnce\nNoMIRACL

[Document(page_content='probability for each document, which are then marginalized,\npRAG-Sequence(y|x) ≈\nX\nz∈top-k(p(·|x))\npη(z|x)pθ(y|x, z) =\nX\nz∈top-k(p(·|x))\npη(z|x)\nN\nY\ni\npθ(yi|x, z, y1:i−1)\nRAG-Token Model\nIn the RAG-Token model we can draw a different latent document for each\ntarget token and marginalize accordingly. This allows the generator to choose content from several\ndocuments when producing an answer. Concretely, the top K documents are retrieved using the\nretriever, and then the generator produces a distribution for the next output token for each document, \nbefore marginalizing, and repeating the process with the following output token, Formally, we define:\npRAG-Token(y|x) ≈\nN\nY\ni\nX\nz∈top-k(p(·|x))\npη(z|x)pθ(yi|x, z, y1:i−1)\nFinally, we note that RAG can be used for sequence classification tasks by considering the target class\nas a target sequence of length one, in which case RAG-Sequence and RAG-Token are equivalent.\n2. 2\nRetriever: DPR\nThe retrieval component pη(z|x) is based on DPR [26]. DPR follows a bi-encoder architecture:\npη(z|x) ∝exp\n\x00d(z)⊤q(x)\n\x01\nd(z) = BERTd(z), q(x) = BERTq(x)\nwhere d(z) is a

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Response From hybrid Search

[Document(page_content='conscious. There are also those who are not yet in touch of their true talents and\nabilities during the early developmental stages of their social life, specifically in\nschool. Ironically, this is usually the time when they needed to show off the most\n \nGet Your Free Bonus Gift\nClick Here to Download Your Free Gift\nimportant especially when having conversations. It makes you appear\nmore respectablewhile also helping you look and feel more confident.\nJust remember to keep your head level and maintain eye contact whilst\nconversing. Do this for 30 days. You should also consider “practice”\nyour posture at home in front of the mirror.\nThe Alpha Grooming An alpha male is well-groomed – period. People say that\nyou shouldn’t judge a book by its cover, but most of them do it anyway. It’s not\na question of morality – it’s just a fact as far as social norms go. If you are well-\ngroomed, you can expect better treatment than those who dress like bums. For\nthe next 30 days, take note of the following grooming tips:\n1. Always Wear Mature Clothing – Clothing and style are two of the\nthings that are easy to nail in order to be an alpha. The first rule is to\nalways be appropriate. Never overdress or underdress for absolutely\nall occasions. Additionally, mind your choice of clothes. Avoid shirts\nwith profane or immature designs and aim for simple yet stylish.\nWhen in doubt, go for darker shades and neutral colors since they suit\nmost skin types. \n2. At Least Trim your Hair–Here’s an undeniable fact: only a few\nguys can wear the caveman head and facial hair and still look good.\nIt’s almost exclusive to Hollywood actors, millionaires, musicians,\nand models. But in the real world, keeping your hair short and neat\nmakes you look more mature and professional. One particular rule in\ndating is to have shorter hair than women, otherwise it will look\nunnatural.\n3. Stubble is Okay; Full Beards are not – In terms of facial hair, you'), Document(page_content='2. At Least Trim your Hair–Here’s an undeniable fact: only a few\nguys can wear the caveman head and facial hair and still look good.\nIt’s almost exclusive to Hollywood actors, millionaires, musicians,\nand models. But in the real world, keeping your hair short and neat\nmakes you look more mature and professional. One particular rule in\ndating is to have shorter hair than women, otherwise it will look\nunnatural.\n3. Stubble is Okay; Full Beards are not – In terms of facial hair, you\ncan never go wrong with stubble as it can make you instantly more\nmasculine. Just remember to trim or shave occasionally to prevent it\nfrom growing too

[Document(page_content='days, practice centering your weight to the middle portion of your feet. Lift up\nyour chest, keep your shoulders aligned, and stick your butt out.\n▪ Sitting Straight –A lot of people actually find it more difficult to\nmaintain posture while sitting than when standing. The first reason is\nbecause people think they can get away with an improper sitting posture\neasily. Secondly, people generally spend more time sitting that they seem\nto fail to maintain the proper sitting posture most of the time. For 30\ndays,be actively conscious of your spine and see to it that it’s always\nstraight while sitting. When working for prolonged periods, set a\nrecurring alarm every 15-30 minutes to remind yourself to straighten\nyour posture.\n▪ Chin Up – The next component of the alpha posture is extremely\n4. Character – Can you identify the positive aspects of your own\ncharacter? Do you consider yourself as a persevering professional,\na lifelong learner, or a person with principles? Remember that the\npositive things in your character will earn you respect.\nRemember; you can use these strengths to build your self-confidence by\nexercising them and accomplishing something. By the end of this chapter, you\nwill set goals for yourself and perform other activities during the first week that\nget you started on the right track. There is just one last thing you need to\nunderstand before you do so.\nDealing with your Weaknesses Even the alphas are not perfect. Every single\nperson in this world is lacking in certain departments whether they can improve\nthem or not. Some are superficial while some are embedded on a person’s way\nof living or mindset. But whatever your weakness is, you will do well in\nacknowledging them completely and understanding how you can turn them into\nreal opportunities.\nKeep in mind that an alpha male is a student of life – a lifelong learner. They\ncan spot their imperfections and somehow turn them into challenges to make life'), Document(page_content='colleagues by identifying their strengths and encouraging them to\ntake advantage of it.\n2. Being Financially Sound – An alpha male knows his way around\nmoney. Another rule in dating is to always pay for the food. So you\nhave to make sure you always have an extra saved for a rainy day.\nFor the next 30 days, save at least $10 per day by cutting expenses or\nfinding opportunities for additional income. Also try to invest in your\nknowledge when it comes to investments.\nChapter 3 – Looking the Part\n \nYou may have integrated the alpha mindset in your lifestyle, but it’s time for\nyou to look the part for a complete package. The reason why this comes first\nbefore health is because you want to get results fast. And believe it or not,\nlooking like an alpha can be incredibly easy but hard to maintain in the long run.\nThe Alpha Posture You simply can’t pull off the alpha male part without the\nproper, manly posture. Believe it or not, it can improve the way you will look\nregardless of which clothes you wear or how big your waistline is. Posture alone\ncan also separate the chivalrous gentlemen from the unattractive guys that\nwomen won’t touch with a 10-foot pole. Without further ado, here are the things\nyou need to remember for proper posture: ▪ Stand Straight – Appearing\nconfident and dignified is one of the main goals of having a good posture. By\nstanding straight, you are maximizing your height, which is an absolute must for\nattracting ladies.It also works by making you appear healthier overall. For 30\ndays, practice centering your weight to the middle portion of your feet. Lift up\nyour chest, keep your shoulders aligned, and stick your butt out.\n▪ Sitting Straight –A lot of people actually find it more difficult to\nmaintain posture while sitting than when standing. The first reason is\nbecause people think they can get away with an improper sitting posture\neasily. Secondly, people generally spend more time sitting that they seem'), Document(page_content='improve your shape. For the next 30 days, perform pushups, sit ups, \nand squats every day for as muchas you can – but never less than 50\neach. Normally, you would divide this number into different sets. You\ncan do these exercises in any order you prefer.\n▪ Take Care of your Skin –In addition to staying in shape, taking\ngood care of your skin will make you feel more confident and\nattractive. Make sure you use a facial wash specifically for men. If not,\ntry something mild especially if you have blemishes such as pimples\nor shaving cuts. For the next 30 days, establish a daily skincare\nroutine, starting by making sure you wash your face at least twice per\n▪ Physical Characteristics – First of all, it is entirely possible that\nyour physical characteristics are strengths. Still, there is always room\nfor improvement. Improving your physical characteristics and health\nwill be an integral part of your 30 days to becoming alpha.\nBeing an Achiever Always remember that mindset alone can make the\ndifference between an alpha and a beta

[Document(page_content="4\nLesson 3: Load Data From CSV\n5\nLesson 4: Understand Data with Descriptive Statistics\n6\nLesson 5: Understand Data with Visualization\n7\nLesson 6: Prepare For Modeling by Pre-Processing Data\n8\nLesson 7: Algorithm Evaluation With Resampling Methods\n9\nLesson 8: Algorithm Evaluation Metrics\n10\nLesson 9: Spot-Check Algorithms\n11\nLesson 10: Model Comparison and Selection\n12\nLesson 11: Improve Accuracy with Algorithm Tuning\n14\nLesson 12: Improve Accuracy with Ensemble Predictions\n15\nLesson 13: Finalize And Save Your Model\n16\nLesson 14: Hello World End-to-End Project\n17\nFinal Word Before You Go...\n18\nii\nLesson 3: Load Data From CSV\nMachine learning algorithms need data. You can load your own data from CSV files but when\nyou are getting started with machine learning in Python you should practice on standard\nmachine learning datasets. Your task for todays lesson are to get comfortable loading data into\nPython and to find and load standard machine learning datasets. There are many excellent\nstandard machine learning datasets in CSV format that you can download and practice with on\nthe UCI machine learning repository5.\n\x88 Practice loading CSV files into Python using the CSV.reader()6 function in the standard\nlibrary.\n\x88 Practice loading CSV files using NumPy and the numpy.loadtxt()7 function.\n\x88 Practice loading CSV files using Pandas and the pandas.read csv()8 function.\nTo get you started, below is a snippet that will load the Pima Indians onset of diabetes\ndataset using Pandas directly from the UCI Machine Learning Repository.\n1\n# Load CSV using Pandas from URL\n2\nfrom pandas import read_csv\n3\nurl = 'https://goo.gl/bDdBiA'\n4\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n5\ndata = read_csv(url, names=names)\n6\nprint(data.shape)\nListing 3: Load a CSV dataset from a URL.\nWell done for making it this far! Hang in there.\n5http://archive.ics.uci.edu/ml/\n6https://docs.python.org/2/library/csv.html"), Document(page_content="dataset using Pandas directly from the UCI Machine Learning Repository.\n1\n# Load CSV using Pandas from URL\n2\nfrom pandas import read_csv\n3\nurl = 'https://goo.gl/bDdBiA'\n4\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n5\ndata = read_csv(url, names=names)\n6\nprint(data.shape)\nListing 3: Load a CSV dataset from a URL.\nWell done for making it this far! Hang in there.\n5http://archive.ics.uci.edu/ml/\n6https://docs.python.org/2/library/csv.html\n7http://docs.scipy.org/doc/numpy-1.10.0/reference/generated/numpy.loadtxt.html\n8http://pandas.pydata.org/pandas-docs/stable/generated/pandas.read_csv.html\n5\n\x01\x02\x03\x04\x05\x06\x07\x08\t\x07\x02\n\x06\x05\x06\x0b\x08\x01\x02\x0c\r\x07\n\x0e\n\x0f\x05\r\x04\x08\x10\x0e\r\x04\x11\x06\x08\x01\x05\x06\x05\x12\x13\x11\x14\n\x0c\x07\n\x01\x02\x03\x04\x05\x06\x07\x08\x07\t\x03\n\x07\x02\x05\x0b\x03\x05\x0c\r\x0e\x0f\x03\x10\x05\n\x11\x12\x13\x0f\x14\x10\x07\x05\x15\x07\x12\x02\x10\x14\x10\x16\x05\x0c\x02\x12\x13\x0e\x14\x0e\x14\x03\x10\x07\x02\x05\n\x14\x10\x05\x17\x18\x05\x06\x12\r\x19\n\x01\x02\x03\x04\x05\x06\x07\x08\x04\t\x05\n\x0b\x0b\nLesson 11: Improve Accuracy with\nAlgorithm Tuning\nOnce you have found one or two algorithms that perform well on your dataset, you may want to\nimprove the performance of those models. One way to increase the performance of an algorithm\nis to tune it’s parameters to your specific dataset. The scikit-learn library provides two ways to\nsearch for combinations of parameters for a machine learning algorithm:\n\x88 Tune the parameters of an algorithm using a grid search that you specify.\n\x88 Tune the parameters of an algorithm using a random search.\nYour goal in todays lesson is to practice each search method. The snippet below uses is an\nexample of using a grid search for the Ridge Regression algorithm on the Pima Indians onset of\ndiabetes dataset.\n1\n# Grid Search for Algorithm Tuning\n2\nfrom pandas import read_csv\n3\nimport numpy\n4\nfrom sklearn.linear_model import Ridge\n5\nfrom sklearn.model_selection import GridSearchCV\n6\nurl = 'https://goo.gl/bDdBiA'\n7\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n8\ndataframe = read_csv(url, names=names)\n9\narray = dataframe.values\n10\nX = array[:,0:8]\n11\nY = array[:,8]\n12\nalphas = numpy.array([1,0.1,0.01,0.001,0.0001,0])\n13\nparam_grid = dict(alpha=alphas)\n14"), Document(page_content="started and productive with machine learning in Python:\n\x88 Lesson 1: Download and Install Python and SciPy Ecosystem.\n\x88 Lesson 2: Get Around In Python, NumPy, Matplotlib and Pandas.\n\x88 Lesson 3: Load Data From CSV.\n1\nLesson 4: Understand Data with\nDescriptive Statistics\nOnce you have loaded

[Document(page_content="https://machinelearningmastery.com/machine-learning-with-python/\n1http://MachineLearningMastery.com\nLesson 6: Prepare For Modeling by\nPre-Processing Data\nYour raw data may not be setup to be in the best shape for modeling. Sometimes you need to\npre-process your data in order to best present the inherent structure of the problem in your\ndata to the modeling algorithms. In today's lesson, you will use the pre-processing capabilities\nprovided by the scikit-learn.\nThe scikit-learn library provides two standard idioms for transforming data. Each are useful\nin different circumstances: Fit and Multiple Transform and Combined Fit-And-Transform.\nThere are many techniques that you can use to prepare your data for modeling, for example try\nout some of the following:\n\x88 Standardize numerical data (e.g. mean of 0 and standard deviation of 1) using the scale\nand center options.\n\x88 Normalize numerical data (e.g. to a range of 0-1) using the range option.\n\x88 Explore more advanced feature engineering such as Binarizing.\nFor example, the snippet below loads the Pima Indians onset of diabetes dataset, calculates\nthe parameters needed to standardize the data, then creates a standardize copy of the input\ndata.\n1\n# Standardize data (0 mean, 1 stdev)\n2\nfrom sklearn.preprocessing import StandardScaler\n3\nfrom pandas import read_csv\n4\nimport numpy\n5\nurl = 'https://goo.gl/bDdBiA'\n6\nnames = ['preg', 'plas', 'pres', 'skin', 'test', 'mass', 'pedi', 'age', 'class']\n7\ndataframe = read_csv(url, names=names)\n8\narray = dataframe.values\n9\n# separate array into input and output components\n10\nX = array[:,0:8]\n11\nY = array[:,8]\n12\nscaler = StandardScaler().fit(X)\n13\nrescaledX = scaler.transform(X)\n14\n# summarize transformed data\n15\nnumpy.set_printoptions(precision=3)\n16\nprint(rescaledX[0:5,:])\nListing 6: Standardize a Dataset.\n8\nLesson 2: Get Around In Python,\nNumPy, Matplotlib and Pandas\nYou need to be able to read and write basic Python scripts. As a developer you can pick-up new"), Document(page_content="hyperparameters without sacrificing model performance.\n4. Integrated Explainability and Interpretability Features: There is a growing interest in\nexplainable AI, and team members have asked for integrated features that can provide\ninsights into ML models' behavior, such as feature importance, partial dependence plots,\nand SHAP values.\n5. Improved Model Visualization Tools: Many team members have expressed interest in\nhaving better visualization tools for understanding the structure and behavior of ML models,\nparticularly in high-dimensional spaces.\n6. Enhanced Transfer Learning Capabilities: There is a desire for more advanced transfer\nlearning techniques that can adapt pre-trained models to new tasks or domains with\nminimal additional training data.\n7.

[Document(page_content='inition is to look for features with low variance. In fact, for binary\nfeatures, ones that almost never appear or almost always appear will\nalso have low variance. Figure 4.9 shows the result of pruning low-\nvariance features on the digit recognition task. Again, at first pruning\ndoes not hurt (and sometimes helps!) but eventually we have thrown\nout all the useful features.\nEarlier we discussed the problem\nof scale of features (eg., millimeters\nversus centimeters). Does this have\nan impact on variance-based feature\npruning?\n?\nOnce you have pruned away irrelevant features, it is often useful\nto normalize the data so that it is consistent in some way. There are\ntwo basic types of normalization: feature normalization and exam-\nple normalization. In feature normalization, you go through each\nfeature and adjust it the same way across all examples. In example\nnormalization, each example is adjusted individually.\nThe goal of both types of normalization is to make it easier for your\nlearning algorithm to learn. In feature normalization, there are two\nstandard things to do: \n1. Centering: moving the entire data set so that it is centered around\nthe origin.\n2. Scaling: rescaling each feature so that one of the following holds:\n(a) Each feature has variance 1 across the training data.\n(b) Each feature has maximum absolute value 1 across the train-\ning data.\nThese transformations are shown geometrically in Figure 4.10. The\nDraft:\nDo Not\nDistribute\n52\na course in machine learning\naway all locality information in the image. Learning algorithms don’t\ncare about features: they only care about feature values. So I can\npermute all of the features, with no effect on the learning algorithm\n(so long as I apply the same permutation to all training and test\nexamples). Figure 4.1 shows some images whos pixels have been\nrandomly permuted (in this case only the pixels are permuted, not\nthe colors). All of these objects are things that you’ve seen plenty of'), Document (page_content='features are “on.” For instance, out of a vocabulary of 10, 000 or\n100, 000 words, a given document probably only contains about 100.\nFrom a storage and computation perspective, this is very useful.\nHowever, after centering, the data will no longer sparse and you will\npay dearly with outrageously slow implementations.\nFigure 4.11: prac:exnorm: example of\nexample normalization\nIn example normalization, you view examples one at a time. The\nmost standard normalization is to ensure that the length of each\nexample vector is one: namely, each example lies somewhere on the\nunit hypersphere. This is a simple transformation:\nExample Normalization:\nxn ←xn/ ||xn||\n(4.7)\nThis transformation is depicted in Figure 4.11.\nThe main advantage to example normalization is that it makes\ncomparisons more straightforward across data sets. If I hand you\ntwo data sets

[Document(page_content='type?” That is actually the weird thing about Linux. They expect you, as the system\nadministrator, to know what that file is. So if you are going to modify text files,\nunderstand that they are not going to have .txt file extensions. It will just be the\nfilename. You must understand what file it is you need to modify first before you\nuse a file editor software to edit that file.\nAll the configuration files in Linux have to be edited using a file editor. If you do\nnot understand how to edit documents or text in Linux, you are not going to get\nanywhere.\nSudo\nThe first command that we need to talk about before you start doing any of the\nother commands is “sudo.” Sudo basically means “super user do.” In the previous\nchapters, we discussed how different distributions do things slightly differently,\nand that every single distribution of Linux has its own quirks; its own little ways of\ndoing things depending on what the creators are worried about.\nOne of the things that the creators of Ubuntu Linux were worried about was\nsecurity. As what we talked about before, in every Linux computer, there is a user\ncalled Root. Root is the highest level user on the computer. It is kind of like the\nadministrator in a Microsoft Windows computer.\nJust like on a Windows computer, if somebody logged in as the administrator, or\nsomebody logged in as root on Linux, they can do absolutely anything they want to\nthat computer. They can install viruses, malware, or spyware, or basically just\ncause a lot of havoc. Hackers, using special programs and scripts, can also try to\nlogin as Root and cause all these problems.\nTo alleviate the possibility of a hacker obtaining root access, the Ubuntu creators\ndecided they never want anybody to login straight as Root. So in Ubuntu Linux,\nyou cannot login as the user Root.\nNow, here comes the problem. Since you cannot login as Root, how do you do all\nthese administrative tasks then? How do you execute administrative processes?'), Document(page_content='also creates files. So if you type that command in the command prompt, that will\ncreate the file and open it at the same time. With that in mind, opening files and\ncreating files uses the exact same command.\nFor some of you users with experience in using other versions of Linux who are\nalso reading this book, you may notice that you can run the vim command without\nsudo. The problem with running vim without sudo, at least in the Ubuntu\ndistribution, is sometimes it will work right and sometimes it will not. It is a case-\nto-case basis wherein some of the configuration files will open and can be edited\nwithout using sudo while others will not edit properly.\nAnd you can run into problems where, if you open a configuration file with simply\nvim and the filename, you will not be able to save the file once you are finished\nediting it. Why? Because you did not open that file as an administrator. This is\nwhy it is always considered good practice to use sudo whenever you are doing\ncritical tasks in Linux.\nChapter 7: Advanced Linux Navigation\nIn this chapter, we will talk about advanced Linux navigation. In chapter 5, we\nhave already talked about how to change directories in Linux. Now, we will discuss\nhow to find folders in Linux, how you make and remove directories, how you copy\nfiles, and then finally how you mount drives in Linux.\nChanging Directories and Finding Files\nIn the last chapter, we talked about how you edit configuration files using Vim,\nwhich is pretty essential in Linux. Now, as you sit there and look at the file system,\nyou probably have no idea where those configuration files are in the first place. If\nyou wanted to edit the php.ini file for example, the question that you may be\nasking since you are a beginner in Linux is, where is the php.ini file located?\nSo, to find any particular file that you want to edit, you must first learn how to get\nto the folder or directory where that particular file is located. Again, to change'), Document(page_content='cause a lot of havoc. Hackers, using special programs and scripts, can also try to\nlogin as Root and cause all these problems.\nTo alleviate the possibility of a hacker obtaining root access, the Ubuntu creators\ndecided they never want anybody to login straight as Root. So in Ubuntu Linux,\nyou cannot login as the user Root.\nNow, here comes the problem. Since you cannot login as Root, how do you do all\nthese administrative tasks then? How do you execute administrative processes?\nWhat they have is this program called sudo. It is basically a command prefix that\ntells the operating system that you want to run a particular process as the super\nuser or root.\nSudo temporarily gives a user administrative access—root access—to execute an\nessential command in Linux. In the Windows operating system, sudo is the\nequivalent of the “Run as Administrator” option each time you want to run a\nprogram with administrative rights in Windows.\nAs you can see, Linux will not be able to find the directory with an uppercase ETC.\nWhy? Because Linux cares about capitalization. Uppercase letters are

[Document(page_content='management, and services such as Internet access and VPN entry from the out-\nside world exist at this level.\n \n■Level 4: Business planning and logistics network: The IT services exist at this \nlevel and may include scheduling systems, material flow applications, optimiza-\ntion and planning systems, and local IT services such as phone, email, printing, \nand security monitoring.\n \n■Industrial demilitarized zone\n \n■DMZ: The DMZ provides a buffer zone where services and data can be shared \nbetween the operational and enterprise zones. It also allows for easy segmenta-\ntion of organizational control. By default, no traffic should traverse the DMZ; \neverything should originate from or terminate on this area.\n \n■Operational zone\n \n■Level 3: Operations and control: This level includes the functions involved in \nmanaging the workflows to produce the desired end products and for monitor-\ning and controlling the entire operational system. This could include production \nscheduling, reliability assurance, systemwide control optimization, security man-\nagement, network management, and potentially other required IT services, such as \nDHCP, DNS, and timing.\n \n■Level 2: Supervisory control: This level includes zone control rooms, controller \nstatus, control system network/application administration, and other control-\nrelated applications, such as human-machine interface (HMI) and historian.\n \n■Level 1: Basic control: At this level, controllers and IEDs, dedicated HMIs, and \nother applications may talk to each other to run part or all of the control function.\n \n■Level 0: Process: This is where devices such as sensors and actuators and \nmachines such as drives, motors, and robots communicate with controllers or IEDs.\n \n■Safety zone\n \n■Safety-critical: This level includes devices, sensors, and other equipment used to \nmanage the safety functions of the control system.\nOne of the key advantages of designing an industrial network in structured levels, as'), Document(page_content='by network engineering groups. Finding network professionals with experience performing \nsuch functions or even training those without prior experience is not difficult.\nAnother security practice that adds value to a networked industrial space is conver-\ngence, which is the adoption and integration of security across operational boundaries. \nThis means coordinating security on both the IT and OT sides of the organization. \nConvergence of the IT and OT spaces is merging, or at least there is active coordination \nacross formerly distinct IT and OT boundaries. From a security perspective, the value \nfollows the argument that most new networking and compute technologies coming to the \noperations space were previously found and established in the IT space. It is expected to \nalso be true that the practices and tools associated with those new technologies are likely \nto be more mature in the IT space.\nHow IT and OT Security Practices and Systems Vary 257\nThe Purdue Model for Control Hierarchy\nRegardless of where a security threat arises, it must be consistently and unequivocally \ntreated. IT information is typically used to make business decisions, such as those in \nprocess optimization, whereas OT information is instead characteristically leveraged to \nmake physical decisions, such as closing a valve, increasing pressure, and so on. Thus, \nthe operational domain must also address physical safety and environmental factors as \npart of its security strategy—and this is not normally associated with the IT domain. \nOrganizationally, IT and OT teams and tools have been historically separate, but this has \nbegun to change, and they have started to converge, leading to more traditionally IT-centric \nsolutions being introduced to support operational activities. For example, systems such as \nfirewalls and intrusion prevention systems (IPS) are being used in IoT networks.\nAs the borders between traditionally separate OT and IT domains blur, they must align'), Document(page_content='and Chapter 10, “Oil and Gas.”\nEnterprise Zone\nDMZ\nOperations Support\nProcess Control / \nSCADA Zone\nDemilitarized Zone — Shared Access\nEnterprise Network\nLevel 5\nBusiness Planning and Logistics Network\nLevel 4\nOperations and Control\nLevel 3\nSupervisory Control\nLevel 2\nBasic Control\nLevel 1\nProcess\nLevel 0\nSafety-Critical\nSafety\nFigure 8-3 The Logical Framework Based on the Purdue Model for Control Hierarchy\nCommon Challenges in OT Security 253\nInternational Electrotechnical Commission (IEC) Protocols\nThe IEC 61850 standard was created to allow vendor-agnostic engineering of power \nutility systems, which would, in turn, allow interoperability between vendors and stan-\ndardized communication protocols. Three message types were initially defined: MMS \n(Manufacturing Message Specification), GOOSE (Generic Object Oriented Substation \nEvent), and SV (Sampled Values). Web services was a fourth protocol that was added later. \nHere

[Document(page_content='Duplicate tuples are automatically eliminated. \n \nTUTORIALS POINT \nSimply Easy Learning \nPage 7 \n \nDBMS Overview \nDatabase is collection of data which is related by some aspect. Data is collection of facts and figures \nwhich can be processed to produce information. Name of a student, age, class and her subjects can be \ncounted as data for recording purposes. \nMostly data represents recordable facts. Data aids in producing information which is based on facts. For \nexample, if we have data about marks obtained by all students, we can then conclude about toppers and \naverage marks etc. \nA database management system stores data, in such a way which is easier to retrieve, manipulate and helps \nto produce information. \nCharacteristics \nTraditionally data was organized in file formats. DBMS was all new concepts then and all the research was \ndone to make it to overcome all the deficiencies in traditional style of data management. Modern DBMS has \nthe following characteristics: \n\uf0b7 \nReal-world entity: Modern DBMS are more realistic and uses real world entities to design its architecture. \nIt uses the behavior and attributes too. For example, a school database may use student as entity and \ntheir age as their attribute. \n\uf0b7 \nRelation-based tables: DBMS allows entities and relations among them to form as tables. This eases the \nconcept of data saving. A user can understand the architecture of database just by looking at table names \netc. \n\uf0b7 \nIsolation of data and application: A database system is entirely different than its data. Where database \nis said to active entity, data is said to be passive one on which the database works and organizes. DBMS \nalso stores metadata which is data about data, to ease its own process. \n\uf0b7 \nLess redundancy: DBMS follows rules of normalization, which splits a relation when any of its attributes \nis having redundancy in values. Following normalization, which itself is a mathematically rich and scientific'), Document (page_content='Users \nDBMS is used by various users for various purposes. Some may involve in retrieving data and some may \ninvolve in backing it up. Some of them are described as follows: \n \n \n [Image: DBMS Users] \n\uf0b7 \nAdministrators: A bunch of users maintain the DBMS and are responsible for administrating the \ndatabase. They are responsible to look after its usage and by whom it should be used. They create users \naccess and apply limitation to maintain isolation and force security. Administrators also look after DBMS \nresources like system license, software application and tools required and other hardware related \nmaintenance. \n\uf0b7 \nDesigner: This is the group of people who actually works on designing part of database. The actual \ndatabase is started with requirement analysis followed by a good designing process. They people keep a \nclose watch on what data should be kept and in what format. They identify and design the whole set of \nentities, relations, constraints and views. \n\uf0b7 \nEnd Users: This group contains the persons who actually take advantage of database system. End users \ncan be just viewers who pay attention to the logs or market rates or end users can be as sophisticated as \nbusiness analysts who take the most of it. \n \nTUTORIALS POINT \nSimply Easy Learning \nPage 45 \n \n \n \n[Image: Relation not in 2NF] \nWe see here in Student_Project relation that the prime key attributes are Stu_ID and Proj_ID. According to the \nrule, non-key attributes, i.e. Stu_Name and Proj_Name must be dependent upon both and not on any of the \nprime key attribute individually. But we find that Stu_Name can be identified by Stu_ID and Proj_Name can be \nidentified by Proj_ID independently. This is called partial dependency, which is not allowed in Second Normal \nForm. \n \n \n[Image: Relation in 2NF]'), Document (page_content='is said to active entity, data is said to be passive one on which the database works and organizes. DBMS \nalso stores metadata which is data about data, to ease its own process. \n\uf0b7 \nLess redundancy: DBMS follows rules of normalization, which splits a relation when any of its attributes \nis having redundancy in values. Following normalization, which itself is a mathematically rich and scientific

[Document(page_content="This makes it easier for the programmer to concentrate on what she is programming. Details of entities are \ngenerally hidden from the user, this process known as abstraction. \nOne of the important features of Generalization and Specialization, is inheritance, that is, the attributes of \nhigher-level entities are inherited by the lower level entities. \n \n \n[Image: Inheritance] \nFor example, attributes of a person like name, age, and gender can be inherited by lower level entities like \nstudent and teacher etc. \nTUTORIALS POINT \nSimply Easy Learning \nPage 14 \n \nDatabase schema can be divided broadly in two categories: \n\uf0b7 \nPhysical Database Schema: This schema pertains to the actual storage of data and its form of storage \nlike files, indices etc. It defines the how data will be stored in secondary storage etc. \n\uf0b7 \nLogical Database Schema: This defines all logical constraints that need to be applied on data stored. It \ndefines tables, views and integrity constraints etc. \nDatabase Instance \nIt is important that we distinguish these two terms individually. Database schema is the skeleton of database. It \nis designed when database doesn't exist at all and very hard to do any changes once the database is \noperational. Database schema does not contain any data or information. \nDatabase instances, is a state of operational database with data at any given time. This is a snapshot of \ndatabase. Database instances tend to change with time. DBMS ensures that its every instance (state) must be \na valid state by keeping up to all validation, constraints and condition that database designers has imposed or \nit is expected from DBMS itself. \nTUTORIALS POINT \nSimply Easy Learning \nPage 63 \n \nFor a hash function to work efficiently and effectively the following must match: \n\uf0b7 \nDistribution of records should be uniform \n\uf0b7 \nDistribution should be random instead of any ordering \nDynamic Hashing"), Document(page_content="the data is organized and how relation among them is associated. It formulates all database constraints that \nwould be put on data in relations, which resides in database. \nA database schema defines its entities and the relationship among them. Database schema is a descriptive \ndetail of the database, which can be depicted by means of schema diagrams. All these activities are done by \ndatabase designer to help programmers in order to give some ease of understanding all aspect of database. \n   \n \n [Image: Database Schemas] \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \n \nCHAPTER \n4 \nTUTORIALS POINT \nSimply Easy

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constraints and condition that database designers has
imposed or \nit is expected from DBMS itself. \nTUTORIALS
POINT \nSimply Easy Learning \nPage 63 \n \nFor a hash
function to work efficiently and effectively the following must
match: \n\uf0b7 \nDistribution of records should be uniform
\n\uf0b7 \nDistribution should be random instead of any
ordering \nDynamic Hashing \nProblem with static hashing is
that it does not expand or shrink dynamically as the size of
database grows or \nshrinks. Dynamic hashing provides a
mechanism in which data buckets are added and removed
dynamically \nand on-demand. Dynamic hashing is also
known as extended hashing. \nHash function, in dynamic

[Document(page_content='exception of typing start instead of stop at the end.\nChanging File Ownership\nFile ownership is another important thing that we need to take note of since we\nare using Vim to edit configuration files. So what do we basically mean by file\nownership? Keep in mind that most of the software that you install on your Linux\nsystem came from their respective developers. In other words, they came from an\nexternal source. When you install them onto your Linux system, the ownership of\nall of the files of that software technically still falls on the developer.\nNow, here is the problem: In Linux, you cannot edit any file unless you are the\nowner of that file. For example, when you install Apache2, mySQL, or PHP on\nyour Linux web server, all the files associated with that software is owned by root\nof the source of the file. If you try to go in and edit some of those files, many times\nyou will not be able to edit them because you are not the owner.\nSo, if you are going to edit configuration files, the first thing that you ought to do is\nchange the ownership from whoever it is to you, just to make your life easy. To do\nthat, you simply type in this command:\n$ sudo chown <username> <filename>\nThe username in the above command pertains to the name of the user that you\nwant to change to the permission to. Filename, on the other hand, pertains to the\nname of the file whose ownership you want to change.\nLet us say your username is reader and you want to change the ownership of the\nfile named notes. All you need to do is type the command syntax below:\n$ sudo chown reader notes\nOnce you do this, you will now become the owner of the file and thus will have the\nability or permission to edit it.\nahead and choose the option that says, “Erase and use the entire disk.” However, if\nyou have another operating system on your hard drive and you want to install\nLinux inside a different disk partition, then choose the option that says, “Specify\npartitions manually.”'),
Document(page_content='file named notes. All you need to do is type the command syntax below:\n$ sudo chown reader notes\nOnce you do this, you will now become the owner of the file and thus will have the\nability or permission to edit it.\nahead and choose the option that says, “Erase and use the entire disk.” However, if\nyou have another operating system on your hard drive and you want to install\nLinux inside a different disk partition, then choose the option that says, “Specify\npartitions manually.”\nSpecifying partitions manually involves telling the installation process how much\ndisk space

[Document(page_content='24\n5. Learn to sweat in peace\n25\n6. Simplify your life\n27\n7. Look for the lost gold\n31\n8. Push all your own buttons\n33\n9. Build a track record\n34\n10. Welcome the unexpected\n35\n11. Find your master key\n36\n12. Put your library on wheels\n38\n13. Definitely plan your work\n41\n14. Bounce your thoughts\n42\n15. Light your lazy dynamite\n44\n16. Choose the happy few\n45\n17. Learn to play a role\n47\n18. Don\'t just do something...sit there\n48\n19. Use your brain chemicals\n50\n20. Leave high school forever\n52\n21. Learn to lose your cool\n54\n22. Kill your television\n56\n23. Break out of your soul cage\n57\n24. Run your own plays\n58\npage_7\nPage 8\n25. Find your inner Einstein\n60\n26. Run toward your fear\n62\n27. Create the way you relate\n64\n28. Try interactive listening\n66\n29. Embrace your will power\n67\n30. Perform your little rituals\n68\n31. Find a place to come from\n70\n32. Be your own disciple\n71\n33. Turn into a word processor\n73\n34. Program your biocomputer\n73\n35. Open your present\n75\n36. Be a good detective\n76\n37. Make a relation-shift\n78\n38. Learn to come from behind\n79\n39. Come to your own rescue\n82\n40. Find your soul purpose\n85\n41. Get up on the right side\n90\n42. Let your whole brain play\n91\n43. Get your stars out\n93\nhis description of enlightenment:\n"To see a world in a grain of sand\nand heaven in a wild flower\nhold infinity in the palm of your hand\nand eternity in an hour."\nSir Walter Scott said he would trade whole years filled with mindless\nconformity for "one hour of life\npage_75\nPage 76\ncrowded to the full with glorious action, and filled with noble risks."\nIt\'s amazing what can be done by people who learn to relax, pay\nattention, and focus, appreciating the present hour and all the\nopportunity it contains.\nIt is said that in America we try to cultivate an appreciation of art, while\nthe Japanese cultivate the art of appreciation. You, too, can cultivate\nthe art of appreciation. Appreciate this hour. This hour, right now, is\npure opportunity.'), Document(page_content='playing by my bed as I went to sleep each night. Everything I had\nlearned in school, in college, and from my family and friends was out\nthe window. Without fully understanding it, I was engaging in the\nprocess of completely rebuilding my own thinking. I was, thought by\nthought, replacing the old cynical and passive orientation to life with a\nnew optimistic and energetic outlook.\nSo, what is this master key to riches?\n" The great master key to riches," said Hill, "is nothing more or

[Document(page_content='Combining allows you to achieve two or more objectives at once.\nFor example, as I plan my day today, I notice that I need to shop for my\nfamily after work. That\'s a task I can\'t avoid because we\'re running out\nof everything. I also note that one of my goals is to finish reading my\nmake a choice makes a choice." \npage_59\nPage 60\n25. Find your inner Einstein\nThe next time you see a picture of Albert Einstein, realize that that\'s\nactually you. See Albert Einstein and say, "there I am." \nEvery human has the capacity for some form of genius. You don\'t have\nto be good with math or physics to experience genius level in your\nthinking. To experience Einstein\'s creative level of thinking, all you\nhave to do is habitually use your imagination.\nThis is a difficult recommendation for adults to follow, though, because\nadults have become accustomed to using their imaginations for only one\nthing: worrying. Adults visualize worst-case scenarios all day long. All\ntheir energy for visualization is channeled into colorful pictures of what\nthey dread.\nWhat they don\'t comprehend is that worry is a misuse of the\nimagination. The human imagination was designed for better things.\nPeople who use their imaginations to create with often achieve things\nthat worriers never dream of achieving, even if the worriers possess\nmuch higher IQs. People who habitually access their imaginations are\noften hailed by their colleagues as "geniuses"—as if "genius" was a\ngenetic characteristic. They would be better understood as people who\nare practiced at accessing their genius. \nRecognition of the power of this genius in all of us prompted Napoleon\nto say, "Imagination rules the world."\nAs a child, you instinctively used your imagination as it was intended. \nYou daydreamed and made stuff up. You were a daydream believer by\nday and in your right brain at night you sailed down a river of dreams.\npage_60\nPage 61\nIf you go back into that state of self-confidence and dream again, you\'ll'), Document(page_content='spirituality, nutrition, or anything important to you.)\nThe power of this system lies in thinking of it as a universe, which, as\nWayne Dyer keeps reminding us, means "one song." When you work\nthe math, you cannot help but see that each circle, if done successfully, \nguarantees the success of the next circle. If you hit your daily goal\nevery day, your monthly goal is automatically hit—in fact you don\'t\neven have to worry about it. And if your monthly goal is reached, the\nyearly goal has to happen. And if your yearly goals are hit, the lifelong\ngoal cannot not be reached.\nWhen you study the irrefutable mathematical truth

[Document(page_content='where \nPoisson\nbinomial\nIt describes the\nnumber of\nsuccesses in a\nseries of\nindependent\nYes/No\nwhere is the set of all\nsubsets of k integers\nthat can be selected\nfrom {1,2,3,...,n}. \n is\nwhere \n \nexperiments\nwith different\nprobabilities of\nsuccess\nthe complement of set\nA.\n \nPoisson\nA discrete\ndistribution. It\ndescribes the\nprobability of\nevents in a\nfixed interval\nof time / space\nwith a known\naverage rate\narriving\nindependently\nfrom time\nsince the last\nevent.\nThe positive real\nnumber λ is the\nexpected value of the\nrandom variable X and\nalso of its variance.\n is an integer\nGaussian\nA distribution\non real.\nThe central\nlimit theorem:\nevery variable\nmodelled as a\nsum of many\ni.i.d, variables\nwith\nfinite mean,\nvariance is\nnormal.\nCode\nNumpy provides full support for all the distributions described above and many\nothers more. The interested reader is encouraged to check them on Wikipedia.\n [22]\nimport numpy as np n, p = 10, .5 # number of trials, probability of each trial s =\nnp.random.binomial(n, p, 100) print s\n50. Can you compare your data with some\ndistribution? What is a qq-plot?\nSolution\nIf you want to investigate whether your data follow some distribution (normal,\nuniform), one useful way is to use a qq-plot, which can compare two probability\ndistributions by plotting their quantiles against each other. If the distributions are\nsimilar, then the graph will show a straight line.\nCode\nimport numpy as np import pylab import scipy.stats as stats measurements =\nnp.random.normal(loc = 40, scale = 10, size=80) \nstats.probplot(measurements, dist="norm", plot=pylab) pylab.show() \n52. What is another way to use Naïve Bayes with\ncontinuous data?\nSolution\nAnother approach for dealing with continuous features is to discretize them in\nbuckets and use Multinomial Naïve Bayes for the discrete model. However some\nattention should be put in place for determining the right number of buckets.\n53. What is the Nearest Neighbor classification?\nSolution'), Document (page_content="of values divided by the number of values: \nThe variance measures how far a set of numbers is spread out. A variance of\nzero shows that all the values are equal; a small variance indicates that the data\npoints tend to be very close to the mean and therefore to each other, while a high\nvariance indicates that the data points are more spread out. Variance is always\npositive. Given a random variable \n the variance is defined as \nThe covariance is a measure of how much two random variables change\ntogether.

[Document(page_content='points to the direction of a function maximum decrease rate.\nIn many Supervised Machine Learning problems, we need to learn a model by\nusing a training dataset. A popular and easy-to-use technique to estimate the\nmodel parameters is to minimize the error associated to the model by using the\nappropriate Gradient Descent technique. The Gradient Descent iteratively\nestimates the weights by moving in the direction which minimizes a chosen cost\nfunction at every step.\n \nThe pseudo-code is here very simple. Until either some convergence or\ntermination criteria is met, the weights of the model are updated according the\nfollowing rule \nwhere \n is the gradient in and is a learning rate parameter.\nIf the function is convex, then the gradient descend will find a unique minimum,\notherwise the technique can be trapped into a local minimum or it might incur\ninto the risk of not converging. Therefore, it is mandatory to stop iterations if a\nchosen maximum number of iteration is reached. In addition to that, it could be\nuseful to repeat the process for different initial values \n in order to detect if the\n30. What is “features hashing”? And why is it useful\nfor BigData?\nSolution\nIf the space of features is high dimensional, one way to reduce dimensionality is\nvia hashing. For instance: we might combine two discrete but sparse features\ninto one and only denser discrete synthetically created feature by transforming\nthe original observations. This transformation introduces an error because it\nsuffers from potential hash collisions, since different raw features may become\nthe same term after hashing.\nHowever this model might be more compact and, in some situations, we might\ndecide to trade off this risk either for simplicity or because this is the only viable\noption to handle very large datasets (Big Data).\nMore sophisticate forms of hashing such as Bloom Filters[14], Count Min-\nSketches[15], minHash[16] and Local Sensitive Hashing[17] are more advanced'), Document (page_content='have a unique minimum and this minimum can be analytically derived[18].\nThis minimization task error can be formally expressed as \n where the\nobjective function has the following form: \nwhere \n are the training examples, is the vector of true labels and \n is a set of weights which are algorithmically computed in such a way that\nthe error of the model learned from the training data is minimized. This error is\nexpressed by a well-chosen loss function\n (see next question for few\nexamples).\nThis method is called “linear”

[Document(page_content='velocity of a particle for any given dimension is limited to Vmax (another\nparameter set by the user) to avoid the particles swarming out of control\n (something that would destabilize the whole process). The exact value of\nthis parameter depends on the problem. \nOther parameters include the number of particles (usually at least 20, with\nmore complex problems usually requiring more particles), the range of the\nvalues of the particles (which is dependent on the problem), and the\nstopping conditions—namely the total number of iterations and the\nminimum error threshold. These stopping conditions are also dependent on\nthe problem.\nTo make PSO faster, we can include an additional parameter that affects\nthe progress the algorithm makes as it searches through the solution space.\nIf a certain number of iterations take place without any significant\nprogress in the objective function, then the algorithm can terminate; in\nthese cases, the swarm usually has gotten stuck in a local optimum.\nMain PSO variants\nJust like most well-established algorithms in AI, PSO has its share of\nvariants, most of which are better-suited for certain sets of problems. The\nmost important of these variants are:\nPSO with inertia (by Shi and Eberhart): a variation of PSO that\nuses an “inertia weight” (usually around 0.9), which gradually\ndecreases, allowing for a narrowing of the search over time. This\nenables PSO to switch from exploratory to exploitative mode,\nyielding more accurate solutions.\nPSO with Neighborhood Operator (by Suganthan): a popular\nvariant of PSO that considers other particles in the same\nneighborhood. The idea is that through this method the chances of\ngetting trapped in a local optimum are greatly reduced, making the\nwhole system more robust.\nDiscrete PSO (by Kennedy and Eberhart): a variant of PSO that\nenables the solution of discrete optimization problems. \nConstriction PSO (by Clerc and Kennedy): a version of PSO that'), Document(page_content='yielding more accurate solutions.\nPSO with Neighborhood Operator (by Suganthan): a popular\nvariant of PSO that considers other particles in the same\nneighborhood. The idea is that through this method the chances of\ngetting trapped in a local optimum are greatly reduced, making the\nwhole system more robust.\nDiscrete PSO (by Kennedy and Eberhart): a variant of PSO that\nenables the solution of discrete optimization problems. \nConstriction PSO (by Clerc and Kennedy): a version of PSO that\ndoesn’t make use of the Vmax parameter. It manages keep velocities\nin check by introducing a couple of additional

[Document(page_content='After you have a thought, you have a response. Maybe it’s a funny feeling,\nfollowed by a comment like “This guy is nuts,” or some other internal dialogue,\npicture, or feeling.\nAll and each of us operate this way, and yet each of us is distinctively different\nAnother example is when you’re looking for someone in a crowd, you’re\nfocusing on specific things and you’re deleting the background. You might scan\na group of people searching only for a certain thing—the color of a sweater, the\nshape of a hat, or long blond hair—everything else in the picture is just\nbackground; you’ve deleted the other elements.\nDISTORTION\nDistortion is changing an experience from what it actually is to some modified\nform of what it is. (Let’s put aside whether you can really know what something\nis and just explore distortion further.) Distortion, too, is natural. We perceive and\nremember people, things, and events based on aspects of the experience: the\ntypical dog, the ideal friend, the worst vacation, and so on. This is a distortion.\nIt’s a bit of the experience, but we have dropped out a whole lot of details and\nfilled in the rest with imagination.\nWhen we perceive a particular characteristic about someone, good or bad, and\napply it to all aspects of that person, that’s distortion, too. With distortion, when\nwe perceive someone as a slow talker, we might distort things so we imagine\nthat they’re also a slow thinker. Similarly, we may conclude that someone who’s\na sharp dresser is a sharp thinker. When you remember a moment of an event as\nrepresenting the whole thing, that’s distortion. When you tell the story of that\nexperience and leave things out and embellish others, that’s distortion. We do\nthis quite frequently.\nThese three ideas don’t really operate independently—they interact. For\nexample, generalization requires deletion, and is a form of distortion. It doesn’t\nmatter that you remember these terms, what’s important is that you recognize'), Document (page_content='possible (with all the senses); looking out from one’s own eyes, hearing from\none’s own ears, feeling one’s own feelings.\nAuditory: The sense of hearing. (See “Representational Systems.”)\nBacktrack: A spoken or written review or summary of information, usually to\nbuild/maintain rapport and to invite revision or correction.\nBeliefs: Generalizations about yourself, other people, and/or the world.\nBehavioral Flexibility: The ability to vary one’s behavior in order to elicit a\ndesired response from another person (in contrast to repeating a behavior that\nhasn’t worked).\nBreak State: To change a person’s state dramatically. Usually used

[Document(page_content='PRINT #main, “COLOR green” \nPRINT #main, “GO 35; TURN 90; UP; GO 35; TURN 90” \nPRINT #main, “COLOR pink”\nPRINT #main, “DOWN; go 35”\nPRINT #main, “FLUSH”\nPRINT #main, “trapclose [quit]” \nWAIT\n[quit]\nCONFIRM “Are you sure you want to quit?”; quit$\nIF quit$ = “no” THEN WAIT\nCLOSE #main\nEND\nDrawing Circles\nBecause drawing individual lines can become tiresome, you may want to tell\nLiberty BASIC to draw circles instead. To draw a circle, you can use the CIRCLE\ncommand as in the following example:\nPRINT #Windowhandle, “CIRCLE R”\nHere’s what’s happening in this example:\n1. The #Windowhandle portion defines the graphics window in which the\ncircle that turtle graphics draws appears. \n2. The CIRCLE R command tells the computer to draw a circle, at the cur-\nrent position of the turtle (pen), with a radius that R defines, where R is\na number such as 35 or 90.\nIf you want to draw your circle in a specific color, you can use the COLOR\ncommand prior to the CIRCLE command, as follows: \nPRINT #Windowhandle, “COLOR darkpink; CIRCLE R” \n168\nPart III: Advanced Programming with Liberty BASIC \nIf your program asks the user to input an age, for example, type a huge number\n(such as 60,000). Then type zero. Finally, type a negative number such as –9,489.\nBy testing extreme ranges of values, you can often smoke out run-time errors\nbefore you release your program for actual use.\nFun with Logic Errors\nOf all the types of bugs that can infest your program, none is more insidious\nthan a logic error. Syntax errors can prove fairly easy to find because you just\nneed to look for misspellings or places where you may have forgotten to type\na character, such as a closing parenthesis. Similarly, you can often find run-time\nerrors by testing your program by using extreme values of data.\nLogic errors, however, occur even after you write your instructions perfectly —\nexcept for the fact that they’re the wrong instructions. Because you assume'), Document(page_content='the keyboard. Any file that contains only text is known as a text file. If you want\nto store, write, or retrieve data from a text file, you always must start reading\nthe text file from the beginning. As a result, text files are sometimes known as\nsequential files.\nYou can also fill in your circle with a specific color by using the BACKCOLOR\ncommand prior to using the CIRCLEFILLED command, as follows:\nPRINT #Windowhandle, “BACKCOLOR yellow; CIRCLEFILLED R”\nTo see how turtle graphics can create circles, try the following program,\nwhich draws two circles, as shown in Figure 12-2:

[Document(page_content="27\n555-6000\nDoug Bentley\n45\n555-0001\nJune Davidson\n23\n555-1002\nDonald Soons\n32\n555-5533\nJan Davis\n31\n555-4444\nField 1\nField 2\nField 3\nField 4\nField 5\nField 6\nText files can't tell where\none chunk of data ends\nand another begins.\nRandom access files store data\nin separate fields for easy\nretrieval later.\nFigure 13-1:\nText files\nstore data\nsequentially\nfrom start \nto finish,\nwhereas\nrandom-\naccess files\nstore data \nin discrete\nchunks. \n181\nChapter 13: Saving and Retrieving Stuff in Files\nBecause text files contain only letters, numbers, and symbols, you can share\ntext files among different computers, such as any computer running Windows,\nLinux, or the Macintosh operating system. If you use the Save As command in\nyour favorite word processor, you find an option to save your document as a\ntext file. Just remember that saving a word-processing document as a text file\nremoves all the document’s formatting, such as underlining or special fonts. \nCreating a new text file\nBefore you can store any data in a text file, you (obviously) must create that\ntext file first. To create a text file, you use the following Liberty BASIC command:\nOPEN “Filename” FOR OUTPUT AS #Handle\nHere’s what’s happening in the preceding example: \n1. The OPEN command tells the computer, “Create a new text file and give \nit the name that “Filename” specifies, which can represent a filename\n(such as STUFF.TXT) or a drive, directory, and filename (such as C:\\\nWINDOWS\\STUFF.TXT).”\n2. The FOR OUTPUT portion of the command tells the computer, “Get ready\nto start outputting data into the newly created text file that “Filename”\nidentifies.”\n3. The #Handle is any nickname that you choose to represent the text file\nyou just created.\nIf you want to create a file that you call STUFF.TXT and save it on a floppy\ndisk (the A drive), use the following command:\nOPEN “A:\\STUFF.TXT” FOR OUTPUT AS #Secrets\nThis line tells Liberty BASIC to create the text file STUFF.TXT on the A drive\nand assign it the name #Secrets."), Document(page_content='text file. Figure 13-1 shows the difference between the way a computer stores\ndata in a text file versus a random-access file.\nThe main advantage of a random-access file is that it can retrieve data more\nefficiently than a text file.\n180\nPart III: Advanced Programming with Liberty BASIC \n5. The seventh line uses the PUT command to store the person’s name, age,\nand phone number into the random access file that the #losers handle\nidentifies. The first time the FOR-NEXT loop runs, the

[Document(page_content='IF (StopNow = 1) OR (Count = ArrayPos) THEN\nTime2Stop = 1\nEND IF\nWEND\nNEXT ArrayPos\nFOR I = 1 TO MaxSize\nPRINT MyArray(I); SPACE$(1);\nNEXT I\nPRINT “(Sorted array)”\nEND\nA typical output for this program appears as follows:\n44 4 98 99 26 (Initial array)\n4 44 98 99 26\n4 26 44 98 99\n4 26 44 98 99)Sorted array)\nThe insertion sort program works as follows:\n1. The first through seventh lines create the variable MaxSize, which\nequals 5; create the array MyArray to hold five integers; generate a\nrandom number; create a random number between 1 and 100; store it in\nthe array MyArray; and then print the array on-screen along with the\nstring (Initial array).\n2. The eighth line is the start of a FOR-NEXT loop that starts counting from\nthe second item in the array, using the variable ArrayPos.\n3. The ninth line creates the variable TempValue and stores the value in\nthe array location that the ArrayPos variable designates. At the begin-\nning of this FOR-NEXT loop, the value of TempValue is equal to the\nsecond item in the array.\n4. The tenth line creates the variable StopNow and sets its value to zero.\nYou use the StopNow variable later in the program to tell the computer\nthat it’s already moved a number to its correctly sorted position in the\narray.\n5. The eleventh line creates the variable Count and sets its value to one.\nYou use the Count variable to locate where in the array to move the\nnumber that the TempValue variable stores.\n6. The twelfth line creates the variable Time2Stop and sets its value to\nzero. You use the Time2Stop variable to tell the program when the array\nis completely sorted.\n7. The thirteenth line is the start of a WHILE-WEND statement that checks\nwhether the value that the Time2Stop variable stores is still equal to\nzero. If so, all the instructions inside the WHILE-WEND statements run.\nFigure 20-5:\nLiberty\nBASIC’s\nbuilt-in\nSORT\ncommand\ncan sort an\narray\nquickly and\neasily with a\nminimum\namount of\nextra code.\n285\nChapter 20: Sorting\nChapter 20\nSorting'), Document(page_content='Subprogram A\nSubprogram A messes\nup data used by\nsubprogram D\nSubprogram F messes\nup data used by\nsubprogram B\nSubprogram B\nSubprogram D\nSubprogram F\nFigure 19-2:\nInstructions\nfrom one\nsubprogram\ncan\naccidentally\nmodify data\nthat another\nsubprogram\nuses.\n273\nChapter 20: Sorting\n8. The fourteenth line is the start of an IF THEN statement that checks\nwhether the value that the TempValue variable (which represents the\nnumber that you want to sort) stores is

[Document(page_content='to the user’s query. These articles, combined with the original\nquestion, form a comprehensive prompt that empowers LLMs\nto generate a well-informed answer.\nThe RAG research paradigm is continuously evolving, and\nwe categorize it into three stages: Naive RAG, Advanced\nRAG, and Modular RAG, as showed in Figure 3. Despite\nRAG method are cost-effective and surpass the performance\nof the native LLM, they also exhibit several limitations.\nThe development of Advanced RAG and Modular RAG is\na response to these specific shortcomings in Naive RAG.\nA. Naive RAG\nThe Naive RAG research paradigm represents the earli-\nest methodology, which gained prominence shortly after the\n18\n[44] B. Wang, W. Ping, P. Xu, L. McAfee, Z. Liu, M. Shoeybi, Y. Dong,\nO. Kuchaiev, B. Li, C. Xiao et al., “Shall we pretrain autoregressive\nlanguage models with retrieval? a comprehensive study,” arXiv preprint\narXiv:2304.06762, 2023.\n[45] B. Wang, W. Ping, L. McAfee, P. Xu, B. Li, M. Shoeybi, and B. Catan-\nzaro, “Instructretro: Instruction tuning post retrieval-augmented pre-\ntraining,” arXiv preprint arXiv:2310.07713, 2023.\n[46] S. Siriwardhana, R. Weerasekera, E. Wen, T. Kaluarachchi, R. Rana,\nand S. Nanayakkara, “Improving the domain adaptation of retrieval\naugmented generation (rag) models for open domain question answer-\ning,” Transactions of the Association for Computational Linguistics,\nvol. 11, pp. 1–17, 2023.\n[47] Z. Yu, C. Xiong, S. Yu, and Z. Liu, “Augmentation-adapted retriever\nimproves generalization of language models as generic plug-in,” arXiv\npreprint arXiv:2305.17331, 2023.\n[48] O. Yoran, T. Wolfson, O. Ram, and J. Berant, “Making retrieval-\naugmented language models robust to irrelevant context,” arXiv\npreprint arXiv:2310.01558, 2023.\n[49] H.-T. Chen, F. Xu, S. A. Arora, and E. Choi, “Understanding re-\ntrieval augmentation for long-form question answering,” arXiv preprint\narXiv:2310.12150, 2023.\n[50] W. Yu, H. Zhang, X. Pan, K. Ma, H. Wang, and D. Yu, “Chain-of-note:'), Document(page_content='yet it has not been accompanied by a systematic synthesis that\ncould clarify its broader trajectory. This survey endeavors to\nfill this gap by mapping out the RAG process and charting\nits evolution and anticipated future paths, with a focus on the\nintegration of RAG within LLMs. This paper considers both\ntechnical paradigms and research methods, summarizing three\nmain research paradigms from over 100 RAG studies, and\nanalyzing key technologies in the core stages of “Retrieval,”\n“Generation,” and “Augmentation.” On the other

[Document(page_content='and Sentence pairs [38]. Detailed information is illustrated in\nTable I.\nB. Indexing Optimization\nIn the Indexing phase, documents will be processed, seg-\nmented, and transformed into Embeddings to be stored in a\nvector database. The quality of index construction determines\nwhether the correct context can be obtained in the retrieval\nphase.\n1) Chunking Strategy: The most common method is to split\nthe document into chunks on a fixed number of tokens (e.g.,\n100, 256, 512) [88]. Larger chunks can capture more context,\nbut they also generate more noise, requiring longer processing\ntime and higher costs. While smaller chunks may not fully\nconvey the necessary context, they do have less noise. How-\never, chunks leads to truncation within sentences, prompting\nthe optimization of a recursive splits and sliding window meth-\nods, enabling layered retrieval by merging globally related\ninformation across multiple retrieval processes [89]. Never-\ntheless, these approaches still cannot strike a balance between\nsemantic completeness and context length. Therefore, methods\nlike Small2Big have been proposed, where sentences (small)\nare used as the retrieval unit, and the preceding and following\nsentences are provided as (big) context to LLMs [90].\n2) Metadata Attachments: Chunks can be enriched with\nmetadata information such as page number, file name, au-\nthor,category timestamp. Subsequently, retrieval can be filtered\nbased on this metadata, limiting the scope of the retrieval.\nAssigning different weights to document timestamps during\nretrieval can achieve time-aware RAG, ensuring the freshness\nof knowledge and avoiding outdated information.\nIn addition to extracting metadata from the original doc-\numents, metadata can also be artificially constructed. For\nexample, adding summaries of paragraph, as well as intro-\nducing hypothetical questions. This method is also known as\nReverse HyDE. Specifically, using LLM to generate questions'), Document(page_content='Token-Elimination [52]\nWikipedia\nText\nChunk\nInference\nOnce\nPaperQA [53]\nArxiv,Online Database,\nPubMed\nText\nChunk\nInference\nIterative\nNoiseRAG [54]\nFactoidWiki\nText\nChunk\nInference\nOnce\nIAG [55]\nSearch Engine,\nWikipedia\nText\nChunk\nInference\nOnce\nNoMIRACL [56]\nWikipedia\nText\nChunk\nInference\nOnce\nToC [57]\nSearch Engine,\nWikipedia\nText\nChunk\nInference\nRecursive\nSKR [58]

[Document(page_content='probability for each document, which are then marginalized,\npRAG-Sequence(y|x) ≈\nX\nz∈top-k(p(·|x))\npη(z|x)pθ(y|x, z) =\nX\nz∈top-k(p(·|x)) \npη(z|x)\nN\nY\ni\npθ(yi|x, z, y1:i−1)\nRAG-Token Model\nIn the RAG-Token model we can draw a different latent document for each\ntarget token and marginalize accordingly. This allows the generator to choose content from several\ndocuments when producing an answer. Concretely, the top K documents are retrieved using the\nretriever, and then the generator produces a distribution for the next output token for each document,\nbefore marginalizing, and repeating the process with the following output token, Formally, we define:\npRAG-Token(y|x) ≈\nN\nY\ni\nX\nz∈top-k(p(·|x))\npη(z|x)pθ(yi|x, z, y1:i−1) \nFinally, we note that RAG can be used for sequence classification tasks by considering the target class\nas a target sequence of length one, in which case RAG-Sequence and RAG-Token are equivalent.\n2.2\nRetriever: DPR\nThe retrieval component pη(z|x) is based on DPR [26]. DPR follows a bi-encoder architecture:\npη(z|x) ∝exp\n\x00d(z)⊤q (x)\n\x01\nd(z) = BERTd(z), q(x) = BERTq(x)\nwhere d(z) is a dense representation of a document produced by a BERTBASE document encoder [8],\nand q(x) a query representation produced by a query encoder, also based on BERTBASE. Calculating\ntop-k(pη(·|x)), the list of k documents z with highest prior probability pη(z|x), is a Maximum Inner\nProduct Search (MIPS) problem, which can be approximately solved in sub-linear time [23]. We use\na pre-trained bi-encoder from DPR to initialize our retriever and to build the document index. This\nretriever was trained to retrieve documents which contain answers to TriviaQA [24] questions and\nNatural Questions [29]. We refer to the document index as the non-parametric memory.\n2. 3\nGenerator: BART\nThe generator component pθ(yi|x, z, y1: i−1) could be modelled using any encoder-decoder. We use\nBART-large [32], a pre-trained seq2seq transformer [58] with 400M parameters. To combine the input'), Document (page_content='2.5\nDecoding\nAt test time, RAG-Sequence and RAG-Token require different ways to approximate arg maxy p(y|x).\nRAG-Token\nThe RAG-Token model can be seen as a standard, autoregressive seq2seq genera-\ntor with transition probability: p′\nθ(yi|x, y1:i−1) = P\nz∈top-k(p(·|x)) pη (zi|x)pθ(yi|x, zi, y1:i−1) To\ndecode, we can plug p′\nθ(yi|x, y1: i−1) into a standard beam decoder.\nRAG-Sequence\nFor RAG-Sequence, the likelihood p(y|x) does not break into a