

Persevere29_M Alfani Irsyadi HTG_Market Basket Analysis

April 2, 2022

```
[1]: !apt-get install texlive texlive-xetex texlive-latex-extra pandoc
!pip install pypandoc
```

Reading package lists... Done

Building dependency tree

Reading state information... Done

pandoc is already the newest version (1.19.2.4~dfsg-1build4).

pandoc set to manually installed.

The following additional packages will be installed:

fonts-droid-fallback fonts-lato fonts-lmodern fonts- noto-mono fonts-texgyre
javascript-common libcupsfilters1 libcupsimage2 libgs9 libgs9-common
libijs-0.35 libjbig2dec0 libjs-jquery libkpathsea6 libpotrace0 libptexenc1
libruby2.5 libsynchronet1 libtexlua52 libtexluajit2 libzip-0-13 lmodern
poppler-data preview-latex-style rake ruby ruby-did-you-mean ruby-minitest
ruby-net-telnet ruby-power-assert ruby-test-unit ruby2.5
rubygems-integration t1utils tex-common tex-gyre texlive-base
texlive-binaries texlive-fonts-recommended texlive-latex-base
texlive-latex-recommended texlive-pictures texlive-plain-generic tipa

Suggested packages:

fonts- noto apache2 | lighttpd | httpd poppler-utils ghostscript
fonts-japanese-mincho | fonts-ipafont-mincho fonts-japanese-gothic
| fonts-ipafont-gothic fonts-arphic-ukai fonts-arphic-uming fonts-nanum ri
ruby-dev bundler debhelper gv | postscript-viewer perl-tk xpdf-reader
| pdf-viewer texlive-fonts-recommended-doc texlive-latex-base-doc
python-pygments icc-profiles libfile-which-perl
libspreadsheet-parseexcel-perl texlive-latex-extra-doc
texlive-latex-recommended-doc texlive-pstricks dot2tex prerex ruby-tcltk
| libtcltk-ruby texlive-pictures-doc vprerex

The following NEW packages will be installed:

fonts-droid-fallback fonts-lato fonts-lmodern fonts- noto-mono fonts-texgyre
javascript-common libcupsfilters1 libcupsimage2 libgs9 libgs9-common
libijs-0.35 libjbig2dec0 libjs-jquery libkpathsea6 libpotrace0 libptexenc1
libruby2.5 libsynchronet1 libtexlua52 libtexluajit2 libzip-0-13 lmodern
poppler-data preview-latex-style rake ruby ruby-did-you-mean ruby-minitest
ruby-net-telnet ruby-power-assert ruby-test-unit ruby2.5
rubygems-integration t1utils tex-common tex-gyre texlive texlive-base
texlive-binaries texlive-fonts-recommended texlive-latex-base
texlive-latex-extra texlive-latex-recommended texlive-pictures

```

texlive-plain-generic texlive-xetex tipa
0 upgraded, 47 newly installed, 0 to remove and 39 not upgraded.
Need to get 146 MB of archives.
After this operation, 460 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-droid-fallback
all 1:6.0.1r16-1.1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-lato all 2.0-2
[2,698 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic/main amd64 poppler-data all
0.4.8-2 [1,479 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 tex-common all 6.09
[33.0 kB]
Get:5 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-lmodern all
2.004.5-3 [4,551 kB]
Get:6 http://archive.ubuntu.com/ubuntu bionic/main amd64 fonts-noto-mono all
20171026-2 [75.5 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic/universe amd64 fonts-texgyre all
20160520-1 [8,761 kB]
Get:8 http://archive.ubuntu.com/ubuntu bionic/main amd64 javascript-common all
11 [6,066 B]
Get:9 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libcupsfilters1
amd64 1.20.2-0ubuntu3.1 [108 kB]
Get:10 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libcupsimage2
amd64 2.2.7-1ubuntu2.8 [18.6 kB]
Get:11 http://archive.ubuntu.com/ubuntu bionic/main amd64 libijs-0.35 amd64
0.35-13 [15.5 kB]
Get:12 http://archive.ubuntu.com/ubuntu bionic/main amd64 libjbig2dec0 amd64
0.13-6 [55.9 kB]
Get:13 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libgs9-common
all 9.26~dfsg+0-0ubuntu0.18.04.15 [5,092 kB]
Get:14 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libgs9 amd64
9.26~dfsg+0-0ubuntu0.18.04.15 [2,265 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic/main amd64 libjs-jquery all
3.2.1-1 [152 kB]
Get:16 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libkpathsea6
amd64 2017.20170613.44572-8ubuntu0.1 [54.9 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic/main amd64 libpotrace0 amd64
1.14-2 [17.4 kB]
Get:18 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 libptexenc1
amd64 2017.20170613.44572-8ubuntu0.1 [34.5 kB]
Get:19 http://archive.ubuntu.com/ubuntu bionic/main amd64 rubygems-integration
all 1.11 [4,994 B]
Get:20 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 ruby2.5 amd64
2.5.1-1ubuntu1.11 [48.6 kB]
Get:21 http://archive.ubuntu.com/ubuntu bionic/main amd64 ruby amd64 1:2.5.1
[5,712 B]
Get:22 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 rake all
12.3.1-1ubuntu0.1 [44.9 kB]

```

Get:23 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-did-you-mean all 1.2.0-2 [9,700 B]
Get:24 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-minitest all 5.10.3-1 [38.6 kB]
Get:25 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-net-telnet all 0.1.1-2 [12.6 kB]
Get:26 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-power-assert all 0.3.0-1 [7,952 B]
Get:27 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 ruby-test-unit all 3.2.5-1 [61.1 kB]
Get:28 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libruby2.5 amd64 2.5.1-1ubuntu1.11 [3,072 kB]
Get:29 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libsyntax1 amd64 2017.20170613.44572-8ubuntu0.1 [41.4 kB]
Get:30 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libtexlua52 amd64 2017.20170613.44572-8ubuntu0.1 [91.2 kB]
Get:31 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libtexluajit2 amd64 2017.20170613.44572-8ubuntu0.1 [230 kB]
Get:32 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 libzip-0-13 amd64 0.13.62-3.1ubuntu0.18.04.1 [26.0 kB]
Get:33 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 lmodern all 2.004.5-3 [9,631 kB]
Get:34 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 preview-latex-style all 11.91-1ubuntu1 [185 kB]
Get:35 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 tiutils amd64 1.41-2 [56.0 kB]
Get:36 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 tex-gyre all 20160520-1 [4,998 kB]
Get:37 <http://archive.ubuntu.com/ubuntu> bionic-updates/main amd64 texlive-binaries amd64 2017.20170613.44572-8ubuntu0.1 [8,179 kB]
Get:38 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-base all 2017.20180305-1 [18.7 MB]
Get:39 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-fonts-recommended all 2017.20180305-1 [5,262 kB]
Get:40 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-latex-base all 2017.20180305-1 [951 kB]
Get:41 <http://archive.ubuntu.com/ubuntu> bionic/main amd64 texlive-latex-recommended all 2017.20180305-1 [14.9 MB]
Get:42 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive all 2017.20180305-1 [14.4 kB]
Get:43 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-pictures all 2017.20180305-1 [4,026 kB]
Get:44 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-latex-extra all 2017.20180305-2 [10.6 MB]
Get:45 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 texlive-plain-generic all 2017.20180305-2 [23.6 MB]
Get:46 <http://archive.ubuntu.com/ubuntu> bionic/universe amd64 tipa all 2:1.3-20 [2,978 kB]

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Get:47 http://archive.ubuntu.com/ubuntu bionic/universe amd64 texlive-xetex all
2017.20180305-1 [10.7 MB]
Fetched 146 MB in 6s (25.9 MB/s)
Extracting templates from packages: 100%
Preconfiguring packages ...
Selecting previously unselected package fonts-droid-fallback.
(Reading database ... 156210 files and directories currently installed.)
Preparing to unpack .../00-fonts-droid-fallback_1%3a6.0.1r16-1.1_all.deb ...
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1) ...
Selecting previously unselected package fonts-lato.
Preparing to unpack .../01-fonts-lato_2.0-2_all.deb ...
Unpacking fonts-lato (2.0-2) ...
Selecting previously unselected package poppler-data.
Preparing to unpack .../02-poppler-data_0.4.8-2_all.deb ...
Unpacking poppler-data (0.4.8-2) ...
Selecting previously unselected package tex-common.
Preparing to unpack .../03-tex-common_6.09_all.deb ...
Unpacking tex-common (6.09) ...
Selecting previously unselected package fonts-lmodern.
Preparing to unpack .../04-fonts-lmodern_2.004.5-3_all.deb ...
Unpacking fonts-lmodern (2.004.5-3) ...
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack .../05-fonts-noto-mono_20171026-2_all.deb ...
Unpacking fonts-noto-mono (20171026-2) ...
Selecting previously unselected package fonts-texgyre.
Preparing to unpack .../06-fonts-texgyre_20160520-1_all.deb ...
Unpacking fonts-texgyre (20160520-1) ...
Selecting previously unselected package javascript-common.
Preparing to unpack .../07-javascript-common_11_all.deb ...
Unpacking javascript-common (11) ...
Selecting previously unselected package libcupsfilters1:amd64.
Preparing to unpack .../08-libcupsfilters1_1.20.2-0ubuntu3.1_amd64.deb ...
Unpacking libcupsfilters1:amd64 (1.20.2-0ubuntu3.1) ...
Selecting previously unselected package libcupsimage2:amd64.
Preparing to unpack .../09-libcupsimage2_2.2.7-1ubuntu2.8_amd64.deb ...
Unpacking libcupsimage2:amd64 (2.2.7-1ubuntu2.8) ...
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack .../10-libijs-0.35_0.35-13_amd64.deb ...
Unpacking libijs-0.35:amd64 (0.35-13) ...
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack .../11-libjbig2dec0_0.13-6_amd64.deb ...
Unpacking libjbig2dec0:amd64 (0.13-6) ...
Selecting previously unselected package libgs9-common.
Preparing to unpack .../12-libgs9-common_9.26~dfsg+0-0ubuntu0.18.04.15_all.deb
...
Unpacking libgs9-common (9.26~dfsg+0-0ubuntu0.18.04.15) ...
Selecting previously unselected package libgs9:amd64.
Preparing to unpack .../13-libgs9_9.26~dfsg+0-0ubuntu0.18.04.15_amd64.deb ...

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Unpacking libgs9:amd64 (9.26~dfsg+0-0ubuntu0.18.04.15) ...
Selecting previously unselected package libjs-jquery.
Preparing to unpack .../14-libjs-jquery_3.2.1-1_all.deb ...
Unpacking libjs-jquery (3.2.1-1) ...
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack .../15-libkpathsea6_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libkpathsea6:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libpotrace0.
Preparing to unpack .../16-libpotrace0_1.14-2_amd64.deb ...
Unpacking libpotrace0 (1.14-2) ...
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack .../17-libptexenc1_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libptexenc1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package rubygems-integration.
Preparing to unpack .../18-rubygems-integration_1.11_all.deb ...
Unpacking rubygems-integration (1.11) ...
Selecting previously unselected package ruby2.5.
Preparing to unpack .../19-ruby2.5_2.5.1-1ubuntu1.11_amd64.deb ...
Unpacking ruby2.5 (2.5.1-1ubuntu1.11) ...
Selecting previously unselected package ruby.
Preparing to unpack .../20-ruby_1%3a2.5.1_amd64.deb ...
Unpacking ruby (1:2.5.1) ...
Selecting previously unselected package rake.
Preparing to unpack .../21-rake_12.3.1-1ubuntu0.1_all.deb ...
Unpacking rake (12.3.1-1ubuntu0.1) ...
Selecting previously unselected package ruby-did-you-mean.
Preparing to unpack .../22-ruby-did-you-mean_1.2.0-2_all.deb ...
Unpacking ruby-did-you-mean (1.2.0-2) ...
Selecting previously unselected package ruby-minitest.
Preparing to unpack .../23-ruby-minitest_5.10.3-1_all.deb ...
Unpacking ruby-minitest (5.10.3-1) ...
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack .../24-ruby-net-telnet_0.1.1-2_all.deb ...
Unpacking ruby-net-telnet (0.1.1-2) ...
Selecting previously unselected package ruby-power-assert.
Preparing to unpack .../25-ruby-power-assert_0.3.0-1_all.deb ...
Unpacking ruby-power-assert (0.3.0-1) ...
Selecting previously unselected package ruby-test-unit.
Preparing to unpack .../26-ruby-test-unit_3.2.5-1_all.deb ...
Unpacking ruby-test-unit (3.2.5-1) ...
Selecting previously unselected package libruby2.5:amd64.
Preparing to unpack .../27-libruby2.5_2.5.1-1ubuntu1.11_amd64.deb ...
Unpacking libruby2.5:amd64 (2.5.1-1ubuntu1.11) ...
Selecting previously unselected package libsyntax1:amd64.
Preparing to unpack .../28-libsyntax1_2017.20170613.44572-8ubuntu0.1_amd64.deb
...

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Unpacking libsynctex1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libtexlua52:amd64.
Preparing to unpack .../29-libtexlua52_2017.20170613.44572-8ubuntu0.1_amd64.deb
...
Unpacking libtexlua52:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
.../30-libtexluajit2_2017.20170613.44572-8ubuntu0.1_amd64.deb ...
Unpacking libtexluajit2:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package libzzip-0-13:amd64.
Preparing to unpack .../31-libzzip-0-13_0.13.62-3.1ubuntu0.18.04.1_amd64.deb ...
Unpacking libzzip-0-13:amd64 (0.13.62-3.1ubuntu0.18.04.1) ...
Selecting previously unselected package lmodern.
Preparing to unpack .../32-lmodern_2.004.5-3_all.deb ...
Unpacking lmodern (2.004.5-3) ...
Selecting previously unselected package preview-latex-style.
Preparing to unpack .../33-preview-latex-style_11.91-1ubuntu1_all.deb ...
Unpacking preview-latex-style (11.91-1ubuntu1) ...
Selecting previously unselected package t1utils.
Preparing to unpack .../34-t1utils_1.41-2_amd64.deb ...
Unpacking t1utils (1.41-2) ...
Selecting previously unselected package tex-gyre.
Preparing to unpack .../35-tex-gyre_20160520-1_all.deb ...
Unpacking tex-gyre (20160520-1) ...
Selecting previously unselected package texlive-binaries.
Preparing to unpack .../36-texlive-
binaries_2017.20170613.44572-8ubuntu0.1_amd64.deb ...
Unpacking texlive-binaries (2017.20170613.44572-8ubuntu0.1) ...
Selecting previously unselected package texlive-base.
Preparing to unpack .../37-texlive-base_2017.20180305-1_all.deb ...
Unpacking texlive-base (2017.20180305-1) ...
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack .../38-texlive-fonts-recommended_2017.20180305-1_all.deb ...
Unpacking texlive-fonts-recommended (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-base.
Preparing to unpack .../39-texlive-latex-base_2017.20180305-1_all.deb ...
Unpacking texlive-latex-base (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack .../40-texlive-latex-recommended_2017.20180305-1_all.deb ...
Unpacking texlive-latex-recommended (2017.20180305-1) ...
Selecting previously unselected package texlive.
Preparing to unpack .../41-texlive_2017.20180305-1_all.deb ...
Unpacking texlive (2017.20180305-1) ...
Selecting previously unselected package texlive-pictures.
Preparing to unpack .../42-texlive-pictures_2017.20180305-1_all.deb ...
Unpacking texlive-pictures (2017.20180305-1) ...
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack .../43-texlive-latex-extra_2017.20180305-2_all.deb ...

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Unpacking texlive-latex-extra (2017.20180305-2) ...
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack .../44-texlive-plain-generic_2017.20180305-2_all.deb ...
Unpacking texlive-plain-generic (2017.20180305-2) ...
Selecting previously unselected package tipa.
Preparing to unpack .../45-tipa_2%3a1.3-20_all.deb ...
Unpacking tipa (2:1.3-20) ...
Selecting previously unselected package texlive-xetex.
Preparing to unpack .../46-texlive-xetex_2017.20180305-1_all.deb ...
Unpacking texlive-xetex (2017.20180305-1) ...
Setting up libgs9-common (9.26~dfsg+0-0ubuntu0.18.04.15) ...
Setting up libkpathsea6:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up libjs-jquery (3.2.1-1) ...
Setting up libtexlua52:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up fonts-droid-fallback (1:6.0.1r16-1.1) ...
Setting up libsystex1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up libptexenc1:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up tex-common (6.09) ...
update-language: texlive-base not installed and configured, doing nothing!
Setting up poppler-data (0.4.8-2) ...
Setting up tex-gyre (20160520-1) ...
Setting up preview-latex-style (11.91-1ubuntu1) ...
Setting up fonts-texgyre (20160520-1) ...
Setting up fonts-noto-mono (20171026-2) ...
Setting up fonts-lato (2.0-2) ...
Setting up libcupsfilters1:amd64 (1.20.2-0ubuntu3.1) ...
Setting up libcupsimage2:amd64 (2.2.7-1ubuntu2.8) ...
Setting up libjbig2dec0:amd64 (0.13-6) ...
Setting up ruby-did-you-mean (1.2.0-2) ...
Setting up t1utils (1.41-2) ...
Setting up ruby-net-telnet (0.1.1-2) ...
Setting up libijs-0.35:amd64 (0.35-13) ...
Setting up rubygems-integration (1.11) ...
Setting up libpotrace0 (1.14-2) ...
Setting up javascript-common (11) ...
Setting up ruby-minitest (5.10.3-1) ...
Setting up libzip-0-13:amd64 (0.13.62-3.1ubuntu0.18.04.1) ...
Setting up libgs9:amd64 (9.26~dfsg+0-0ubuntu0.18.04.15) ...
Setting up libtexluaajit2:amd64 (2017.20170613.44572-8ubuntu0.1) ...
Setting up fonts-lmodern (2.004.5-3) ...
Setting up ruby-power-assert (0.3.0-1) ...
Setting up texlive-binaries (2017.20170613.44572-8ubuntu0.1) ...
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
(bibtex) in auto mode
Setting up texlive-base (2017.20180305-1) ...
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST...

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mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN...
mktexlsr: Updating /var/lib/texmf/ls-R...
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4:
/var/lib/texmf/tex/generic/config/pdftexconfig.tex
Setting up texlive-fonts-recommended (2017.20180305-1) ...
Setting up texlive-plain-generic (2017.20180305-2) ...
Setting up texlive-latex-base (2017.20180305-1) ...
Setting up lmodern (2.004.5-3) ...
Setting up texlive-latex-recommended (2017.20180305-1) ...
Setting up texlive-pictures (2017.20180305-1) ...
Setting up tipa (2:1.3-20) ...
Regenerating '/var/lib/texmf/fmtutil.cnf-DEBIAN'... done.
Regenerating '/var/lib/texmf/fmtutil.cnf-TEXLIVEDIST'... done.
update-fmtutil has updated the following file(s):
    /var/lib/texmf/fmtutil.cnf-DEBIAN
    /var/lib/texmf/fmtutil.cnf-TEXLIVEDIST
If you want to activate the changes in the above file(s),
you should run fmtutil-sys or fmtutil.
Setting up texlive (2017.20180305-1) ...
Setting up texlive-latex-extra (2017.20180305-2) ...
Setting up texlive-xetex (2017.20180305-1) ...
Setting up ruby2.5 (2.5.1-1ubuntu1.11) ...
Setting up ruby (1:2.5.1) ...
Setting up ruby-test-unit (3.2.5-1) ...
Setting up rake (12.3.1-1ubuntu0.1) ...
Setting up libruby2.5:amd64 (2.5.1-1ubuntu1.11) ...
Processing triggers for mime-support (3.60ubuntu1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.3) ...
/sbin/ldconfig.real: /usr/local/lib/python3.7/dist-
packages/ideep4py/lib/libmkldnn.so.0 is not a symbolic link

Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for fontconfig (2.12.6-0ubuntu2) ...
Processing triggers for tex-common (6.09) ...
Running updmap-sys. This may take some time... done.
Running mktexlsr /var/lib/texmf ... done.
Building format(s) --all.
    This may take some time... done.
Collecting py pandoc
  Downloading py pandoc-1.7.4.tar.gz (30 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done

```



```
Preparing wheel metadata ... done
Building wheels for collected packages: pypandoc
  Building wheel for pypandoc (PEP 517) ... done
  Created wheel for pypandoc: filename=pypandoc-1.7.4-py2.py3-none-any.whl
  size=32102
  sha256=535179eaf5aa11ddd26e01216c49f2fc41a2190d6ffe18d1c8eb9ad71e3a9426
  Stored in directory: /root/.cache/pip/wheels/f1/80/ba/d10ff9f1ebfd8386979b7d86
  b7e8ed055aa8bc8f4900bfc986
Successfully built pypandoc
Installing collected packages: pypandoc
Successfully installed pypandoc-1.7.4
```

```
[2]: from google.colab import drive
     drive.mount('/content/drive')
```

Mounted at /content/drive

```
[12]: !cp "drive/MyDrive/Colab Notebooks/Persevere29_M Alfani Irsyadi HTG_Market_
      ↳Basket Analysis.ipynb" ./
```

```
[12]:
```

1 Market Basket Analysis

Market basket analysis adalah suatu metodologi untuk melakukan analisis buying habit konsumen dengan menemukan asosiasi antar beberapa item yang berbeda, yang diletakkan konsumen dalam shopping basket (keranjang belanja) yang dibeli pada suatu transaksi tertentu. Tujuan dari market basket analysis adalah untuk mengetahui produk-produk mana yang mungkin akan dibeli secara bersamaan

1.1 Algoritma Apriori

Algoritma Apriori adalah suatu algoritma dasar yang diusulkan oleh Agrawal & Srikant pada tahun 1994 untuk penentuan frequent itemsets untuk aturan asosiasi boolean. Algoritma Apriori memberi kita sifat asosiatif dalam transaksi. Ini juga dikenal sebagai Aturan Asosiasi. Aturan asosiasi atau association rule adalah teknik untuk menemukan aturan asosiasi antara suatu kombinasi item. Terdapat 3 metrik untuk mengukur ketepatan aturan, yaitu :

2 Market Basket Analysis

2.1 1. Import Library

Pertama-tama mengimpor library yang akan kita gunakan untuk analisis eksplorasi data dan visualisasi data.

```
[13]: import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

2.2 2. Import Dataset

```
[14]: !curl -o dataset.csv https://raw.githubusercontent.com/alfan-irsyadi/TugasOrbit/
↪main/DataSains/TugasMBA/Market_Basket_Optimisation.csv
```

```
% Total      % Received % Xferd  Average Speed   Time    Time       Time  Current
                               Dload  Upload    Total   Spent    Left   Speed
100  295k  100  295k    0     0   790k      0 --:--:-- --:--:-- --:--:--   790k
```

```
[15]: df = pd.read_csv('dataset.csv', header=None)
print(df.head())
```

	0	1	2	3	4	\
0	shrimp	almonds	avocado	vegetables mix	green grapes	
1	burgers	meatballs	eggs	NaN	NaN	
2	chutney	NaN	NaN	NaN	NaN	
3	turkey	avocado	NaN	NaN	NaN	
4	mineral water	milk	energy bar	whole wheat rice	green tea	

	5	6	7	8	9	\
0	whole weat flour	yams	cottage cheese	energy drink	tomato juice	
1	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	

	10	11	12	13	14	15	\
0	low fat yogurt	green tea	honey	salad	mineral water	salmon	
1	NaN	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	NaN	

	16	17	18	19
0	antioxydant juice	frozen smoothie	spinach	olive oil
1	NaN	NaN	NaN	NaN
2	NaN	NaN	NaN	NaN
3	NaN	NaN	NaN	NaN
4	NaN	NaN	NaN	NaN

Dari tabel diatas, menunjukkan jumlah data pada dataset terdapat 21293 baris dan 4 kolom

2.3 3. Data Preparation

Pada tahapan ini kita akan memastikan tipe data yang digunakan sesuai, tidak ada nilai kosong

```
[16]: # cek tipe data dari setiap kolom
print('Dataset Information: \n')
print(df.info())
```

Dataset Information:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7501 entries, 0 to 7500
Data columns (total 20 columns):
 #   Column  Non-Null Count  Dtype
---  -
 0    0      7501 non-null   object
 1    1      5747 non-null   object
 2    2      4389 non-null   object
 3    3      3345 non-null   object
 4    4      2529 non-null   object
 5    5      1864 non-null   object
 6    6      1369 non-null   object
 7    7       981 non-null   object
 8    8       654 non-null   object
 9    9       395 non-null   object
10   10       256 non-null   object
11   11       154 non-null   object
12   12        87 non-null  object
13   13        47 non-null  object
14   14        25 non-null  object
15   15         8 non-null  object
16   16         4 non-null  object
17   17         4 non-null  object
18   18         3 non-null  object
19   19         1 non-null  object
dtypes: object(20)
memory usage: 1.1+ MB
None
```

Terdapat nilai yang "NA" sehingga kita harus merubah nilai tersebut menjadi 0

```
[17]: ## Data Cleaning step

# replacing empty value with 0.
df.fillna(0,inplace=True)
```

```
[18]: print(df.head(10))
```

0 1 2 3 \

0	shrimp	almonds	avocado	vegetables mix
1	burgers	meatballs	eggs	0
2	chutney	0	0	0
3	turkey	avocado	0	0
4	mineral water	milk	energy bar	whole wheat rice
5	low fat yogurt	0	0	0
6	whole wheat pasta	french fries	0	0
7	soup	light cream	shallot	0
8	frozen vegetables	spaghetti	green tea	0
9	french fries	0	0	0

	4	5	6	7	8 \
0	green grapes	whole weat flour	yams	cottage cheese	energy drink
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	green tea	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

	9	10	11	12	13	14 \
0	tomato juice	low fat yogurt	green tea	honey	salad	mineral water
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0

	15	16	17	18	19
0	salmon	antioxydant juice	frozen smoothie	spinach	olive oil
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0

2.4 4. Visualisasi

```
[19]: items = []
transactions=[]
for i in range(len(df)):
    x_ = []
    for j in range(df.shape[1]):
        x = df.iloc[i,j]

        if(x != 0):
            x_.append(x)
            if x not in items:items.append(x)
    transactions.append(x_)
```

```
[20]: print(transactions[1]) ## lihat transaksi kedua
```

```
['burgers', 'meatballs', 'eggs']
```

```
[21]: # Menghitung jumlah transaksi per item

freq = []
for i in items: freq.append(df[df==i].count().sum())
item_count = pd.DataFrame({'Nama Item':items, "Jumlah":freq})
most_sold = item_count.sort_values(by='Jumlah', ascending=False).head(20)
print(most_sold)
```

	Nama Item	Jumlah
14	mineral water	1788
22	eggs	1348
34	spaghetti	1306
29	french fries	1282
39	chocolate	1230
11	green tea	991
25	milk	972
61	ground beef	737
33	frozen vegetables	715
55	pancakes	713
20	burgers	654
69	cake	608
36	cookies	603
62	escalope	595
10	low fat yogurt	574
0	shrimp	536
43	tomatoes	513
19	olive oil	494
17	frozen smoothie	475
24	turkey	469

terlihat bahwa Mineral Water paling sering dibeli dengan jumlah 1788 transaksi diikuti dengan 'eggs' dengan jumlah 1348 transaksi

```
[22]: def to_persen(x): return x*100/(item_count['Jumlah'].sum())
      print(item_count['Jumlah'].apply(to_persen))
```

```
0      1.825427
1      0.521064
2      0.851412
3      0.657290
4      0.231584
```

```
...
115     0.149848
116     0.112386
117     0.003406
118     0.023840
119     0.017028
```

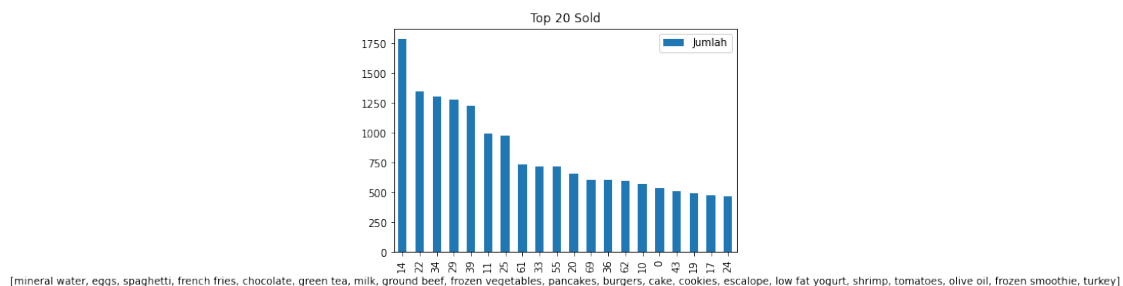
Name: Jumlah, Length: 120, dtype: float64

persentase untuk nilai tertinggi sekitar 1.82%

```
[23]: plt.figure(figsize=(20,6))

      most_sold.plot(kind='bar', xlabel=most_sold['Nama Item'])
      plt.title('Top 20 Sold')
      display(plt.show())
```

<Figure size 1440x432 with 0 Axes>



None

```
[23]:
```

2.5 5. Market Basket Analysis

```
[24]: from mlxtend.preprocessing import TransactionEncoder
      from mlxtend.frequent_patterns import association_rules, apriori
```

```
[25]: te = TransactionEncoder()
      te_ary = te.fit_transform(transactions)
      df2 = pd.DataFrame(te_ary, columns=te.columns_)
      frequent_itemsets = apriori(df2, min_support=0.01, use_colnames=True)
      rules = association_rules(frequent_itemsets, metric='lift', min_threshold=1.0)
      metrix = pd.DataFrame(rules)

      dfku = metrix[['antecedents', 'consequents', 'support', 'confidence', 'lift']]
```

```
[26]: print(dfku.sort_values('lift', ascending=False).head(3))
      # metrix[['antecedents', 'consequents', 'support', 'confidence', 'lift']].
      ↪ sort_values('lift', ascending=False)
```

	antecedents	consequents	support	confidence	\
214	(herb & pepper)	(ground beef)	0.015998	0.323450	
215	(ground beef)	(herb & pepper)	0.015998	0.162822	
385	(ground beef)	(mineral water, spaghetti)	0.017064	0.173677	

	lift
214	3.291994
215	3.291994
385	2.907928

Terlihat bahwa kebanyakan pelanggan membeli "Herb & Pepper" lalu membeli "ground beef"

```
[27]: dfku.sort_values('confidence', ascending=False).head(3)
```

	antecedents	consequents	support	confidence	lift
343	(eggs, ground beef)	(mineral water)	0.010132	0.506667	2.125563
376	(milk, ground beef)	(mineral water)	0.011065	0.503030	2.110308
319	(chocolate, ground beef)	(mineral water)	0.010932	0.473988	1.988472

```
[28]: dfku.sort_values('support', ascending=False).head(3)
```

	antecedents	consequents	support	confidence	lift
274	(mineral water)	(spaghetti)	0.059725	0.250559	1.439085
275	(spaghetti)	(mineral water)	0.059725	0.343032	1.439085
84	(chocolate)	(mineral water)	0.052660	0.321400	1.348332

3 Kesimpulan

Dapat dilihat dari analisis diatas, di mana semakin tinggi nilai peningkatan, semakin kuat korelasi antar item. (format: antecedant(s) -> consequent):

(Herb + pepper) -> ground beef

ground beef -> (herb + pepper)

ground beef -> (spagehetti + mineral water)

Bisnis selalu mencari cara untuk mengoptimalkan pengaturan mereka dan meningkatkan penjualan mereka. Toko roti tidak berbeda, dan analisis semacam ini bisa dilakukan untuk semua jenis toko ritel atau pasar juga. Karena kita sekarang mengetahui korelasi antara item dan kepentingan bersama pelanggan, bisnis dapat membuat keputusan berdasarkan temuan ini. Misalnya, Pasar ini meletakkan herb dan pepper disebelah ground beef

[28] :