

Лабораторная работа №3.

Установка программного обеспечения.

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Задачи:

1. Научиться получать информацию об установленных и доступных пакетах и устанавливать пакеты
2. программного обеспечения из репозитория в Linux.
3. Научиться устанавливать программные продукты из исходных кодов в Linux.
4. Научится конфигурировать менеджер пакетов и создавать собственные репозитории.

Задание:

1. Выведите список всех подключенных репозиториях.

```
root@bad:/home/vr61v# apt-cache policy
```

```
Package files:
```

```
100 /var/lib/dpkg/status
   release a=now
500 http://deb.debian.org/debian bookworm-updates/main arm64 Packages
   release v=12-updates,o=Debian,a=stable-updates,n=bookworm-updates,l=Debian,c=main,b=arm64
   origin deb.debian.org
500 http://security.debian.org/debian-security bookworm-security/main arm64 Packages
   release v=12,o=Debian,a=stable-security,n=bookworm-security,l=Debian-Security,c=main,b=arm64
   origin security.debian.org
500 http://deb.debian.org/debian bookworm/main arm64 Packages
   release v=12.10,o=Debian,a=stable,n=bookworm,l=Debian,c=main,b=arm64
   origin deb.debian.org
```

2. Обновите локальные индексы пакетов в менеджере пакетов.

```
root@bad:/home/vr61v# apt update
```

```
Hit:1 http://deb.debian.org/debian bookworm InRelease
```

```
Hit:2 http://security.debian.org/debian-security bookworm-security InRelease
```

```
Hit:3 http://deb.debian.org/debian bookworm-updates InRelease
```

```
Reading package lists... Done
```

```
Building dependency tree... Done
```

```
Reading state information... Done
```

```
66 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

```
root@bad:/home/vr61v# apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  linux-image-6.1.0-32-arm64
The following packages will be upgraded:
  base-files dns-root-data firefox-esr fonts-opensymbol gir1.2-javascriptcoregtk-4.0 gir1.2-javascriptcoregtk-4.1 gir1.2-webkit2-4.0 gir1.2-webkit2-4.1 libc-bin libc-l10n libc6 libcurl3-gnutls libcurl4
  libgnutls30 libjavascriptcoregtk-4.0-18 libjavascriptcoregtk-4.1-0 libjavascriptcoregtk-6.0-1 libnss-myhostname libnss-systemd libopenh264-7 libpam-systemd librabbitmq4 libreoffice-base-core libreoffice-calc
  libreoffice-common libreoffice-core libreoffice-draw libreoffice-gnome libreoffice-gtk3 libreoffice-help-common libreoffice-help-en-us libreoffice-impress libreoffice-math libreoffice-style-colibre
  libreoffice-style-elementary libreoffice-writer libsystemd-shared libsystemd0 libtasn1-6 libudev1 libuno-cppu3 libuno-cppuhelpergcc3-3 libuno-purpnhelpergcc3-3 libuno-sal3 libuno-salhelpergcc3-3
  libwebkit2gtk-4.0-37 libwebkit2gtk-4.1-0 libwebkitgtk-6.0-4 linux-image-arm64 locales openssl-client python3-uno systemd systemd-sysv systemd-timesyncd tzdata udev uno-libs-private ure vim-common vim-tiny
  wget xserver-common xserver-xephyr xserver-xorg-core xserver-xorg-legacy
66 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0 B/335 MB of archives.
After this operation, 357 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

3. Выведите информацию о метапакете build-essential.

```
root@bad:/home/vr61v# apt show build-essential
Package: build-essential
Version: 12.9
Priority: optional
Build-Essential: yes
Section: devel
Maintainer: Matthias Klose <doko@debian.org>
Installed-Size: 20.5 kB
Depends: libc6-dev | libc-dev, gcc (>= 4:10.2), g++ (>= 4:10.2), make, dpkg-dev (>= 1.17.11)
Tag: devel::packaging, interface::commandline, role::data, role::program,
scope::utility, suite::debian
Download-Size: 7,704 B
APT-Sources: http://deb.debian.org/debian bookworm/main arm64 Packages
Description: Informational list of build-essential packages
 If you do not plan to build Debian packages, you don't need this
 package. Starting with dpkg (>= 1.14.18) this package is required
 for building Debian packages.

This package contains an informational list of packages which are
considered essential for building Debian packages. This package also
depends on the packages on that list, to make it easy to have the
build-essential packages installed.

If you have this package installed, you only need to install whatever
a package specifies as its build-time dependencies to build the
package. Conversely, if you are determining what your package needs
to build-depend on, you can always leave out the packages this
package depends on.

This package is NOT the definition of what packages are
build-essential; the real definition is in the Debian Policy Manual.
This package contains merely an informational list, which is all
most people need. However, if this package and the manual disagree,
the manual is correct.
```

4. Установите метапакет build-essential, при этом определите какие компоненты будут установлены, а какие обновлены.

```
root@bad:/home/vr61v# apt install build-essential
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  linux-image-6.1.0-29-arm64
Use 'apt autoremove' to remove it.
The following additional packages will be installed:
  binutils binutils-aarch64-linux-gnu binutils-common dpkg-dev fakeroot g++ g++-12 gcc gcc-12 libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan8 libbinutils libc-dev-bin
  libc-devtools libc6-dev libcc1-0 libcrypt-dev libctf-nobfd libctf0 libdpkg-perl libfakeroot libfile-fcntllock-perl libgcc-12-dev libgprofng0 libhwasean0 libitm1 liblsan0 libns1-dev libstdc++-12-dev
  libtirpc-dev libtsan2 libubsan1 linux-libc-dev make manpages-dev patch rpcsvc-proto
Suggested packages:
  binutils-doc debian-keyring gcc-12-doc gcc-multilib autoconf automake libtool flex bison gdb gcc-12-locales glibc-doc git bzip2 libstdc++-12-doc make-doc ed diffutils-doc
The following NEW packages will be installed:
  binutils binutils-aarch64-linux-gnu binutils-common build-essential dpkg-dev fakeroot g++ g++-12 gcc gcc-12 libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan8 libbinutils
  libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev libctf-nobfd libctf0 libdpkg-perl libfakeroot libfile-fcntllock-perl libgcc-12-dev libgprofng0 libhwasean0 libitm1 liblsan0 libns1-dev
  libstdc++-12-dev libtirpc-dev libtsan2 libubsan1 linux-libc-dev make manpages-dev patch rpcsvc-proto
0 upgraded, 40 newly installed, 0 to remove and 0 not upgraded.
Need to get 51.0 MB of archives.
After this operation, 216 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

5. Найдите пакет, в описании которого присутствует строка «clone with a bastard algorithm»

```
root@bad:/home/vr61v# apt-cache search "clone with a bastard algorithm"
bastet - ncurses Tetris clone with a bastard algorithm
```

6. Скачайте в отдельную директорию в домашнем каталоге архив с исходными кодами найденного в п.5 пакета.

Для скачивания архива сделал chmod для всех внутренних папок /lab3, /lab3/bastet, потому что при apt source bastet выводило ошибку доступа, а если запускать от root, то тоже выводился permission denied (на сколько я понял это связано с

безопасностью и это запускается от _apt роли, поэтому для скачивания архива нужно запускать apt от обычного юзера).

```
vr61v@bad:~/lab3/bastet$ apt-get source bastet
Reading package lists... Done
NOTICE: 'bastet' packaging is maintained in the 'Git' version control system at:
https://salsa.debian.org/games-team/bastet.git
Please use:
git clone https://salsa.debian.org/games-team/bastet.git
to retrieve the latest (possibly unreleased) updates to the package.
Need to get 43.5 kB of source archives.
Get:1 http://deb.debian.org/debian bookworm/main bastet 0.43-7 (dsc) [2,122 B]
Get:2 http://deb.debian.org/debian bookworm/main bastet 0.43-7 (tar) [29.1 kB]
Get:3 http://deb.debian.org/debian bookworm/main bastet 0.43-7 (diff) [12.3 kB]
Fetched 43.5 kB in 0s (182 kB/s)
dpkg-source: info: extracting bastet in bastet-0.43
dpkg-source: info: unpacking bastet_0.43.orig.tar.gz
dpkg-source: info: unpacking bastet_0.43-7.debian.tar.xz
dpkg-source: info: using patch list from debian/patches/series
dpkg-source: info: applying 01_local_hiscores_file_check.patch
dpkg-source: info: applying 02_manpage_global_hiscore_path.patch
dpkg-source: info: applying debian-bug-931550.patch
dpkg-source: info: applying format-security.patch

vr61v@bad:~/lab3/bastet$ ls
bastet-0.43  bastet_0.43-7.debian.tar.xz  bastet_0.43-7.dsc  bastet_0.43.orig.tar.gz
```

7. Установите пакет из исходных кодов, скаченных в п.6

После чего выполнил make в появившейся папке bastet. Дальше нужно было в MakeFile прописать юзкейс вызова install, что сделал через nano. Запустил make install и проверил ls -la по пути, по которому необходимо было установить bastet.

```
root@bad: /home/vr61v/lab3/bastet/bastet-0.43# make
g++ -MM Ui.cpp main.cpp Block.cpp Well.cpp BlockPosition.cpp Config.cpp BlockChooser.cpp BastetBlockChooser.cpp > depend
g++ -DDEBUG -Wall -c -o Ui.o Ui.cpp
Ui.cpp: In member function 'int Bastet::BorderedWindow::GetMinX()':
Ui.cpp:82:9: warning: variable 'y' set but not used [-Wunused-but-set-variable]
   82 |     int y,x;
      |         ^
Ui.cpp: In member function 'int Bastet::BorderedWindow::GetMaxX()':
Ui.cpp:94:9: warning: variable 'y' set but not used [-Wunused-but-set-variable]
   94 |     int y,x;
      |         ^
Ui.cpp: In function 'Bastet::Dot Bastet::BoudingRect(const std::string&)':
Ui.cpp:174:24: warning: narrowing conversion of '(maxlen + 1)' from 'size_t' (aka 'long unsigned int') to 'int' [-Wnarrowing]
   174 |     return (Dot)(maxlen+1,splits.size());
      |                   ~~~~~^
Ui.cpp:174:38: warning: narrowing conversion of 'splits.std::vector<std::__cxx11::basic_string<char>>::size()' from 'std::vector<std::__cxx11::basic_string<char>>::size_type' (aka 'long unsigned int') to 'int' [-Wnarrowing]
   174 |     return (Dot)(maxlen+1,splits.size());
      |                   ~~~~~^
Ui.cpp: In member function 'int Bastet::Ui::MenuDialog(const std::vector<std::__cxx11::basic_string<char>> >&)':
Ui.cpp:236:17: warning: narrowing conversion of '(width + 5)' from 'size_t' (aka 'long unsigned int') to 'int' [-Wnarrowing]
   236 |     Dot d=(width+5,choices.size());
      |               ~~~~~^
Ui.cpp:236:32: warning: narrowing conversion of '(& choices)->std::vector<std::__cxx11::basic_string<char>>::size()' from 'std::vector<std::__cxx11::basic_string<char>>::size_type' (aka 'long unsigned int') to 'int' [-Wnarrowing]
   236 |     Dot d=(width+5,choices.size());
      |                   ~~~~~^
g++ -DDEBUG -Wall -c -o main.o main.cpp
g++ -DDEBUG -Wall -c -o Block.o Block.cpp
g++ -DDEBUG -Wall -c -o Well.o Well.cpp
g++ -DDEBUG -Wall -c -o BlockPosition.o BlockPosition.cpp
g++ -DDEBUG -Wall -c -o Config.o Config.cpp
g++ -DDEBUG -Wall -c -o BlockChooser.o BlockChooser.cpp
g++ -DDEBUG -Wall -c -o BastetBlockChooser.o BastetBlockChooser.cpp
BastetBlockChooser.cpp: In member function 'virtual Bastet::BlockType Bastet::BastetBlockChooser::GetNext(const Bastet::Well*, const Bastet::Queue&)':
BastetBlockChooser.cpp:118:76: warning: 'std::binder2nd<Operation> std::bind2nd(const Operation&, const Tp&) [with Operation = greater_equal<int>; Tp = long int]' is deprecated: use 'std::bind' instead [-Wdeprecated-declarations]
   118 |     int pos=find_if(blockPercentages.begin(),blockPercentages.end(),bind2nd(greater_equal<int>(),random()%100)) - blockPercentages.begin();
      |                                     ~~~~~^
In file included from /usr/include/c++/12/binders:36,
                  from /usr/include/c++/12/binders:37,
                  from BastetBlockChooser.cpp:1:
/usr/include/c++/12/binders:36:1: note: declared here
   36 | binder2nd(const Operation&, const Tp&)
      | ^~~~~~
root@bad: /home/vr61v/lab3/bastet/bastet-0.43# cat Makefile
SOURCES=Ui.cpp main.cpp Block.cpp Well.cpp BlockPosition.cpp Config.cpp BlockChooser.cpp BastetBlockChooser.cpp
PROGNAME=bastet
LD_FLAGS+=-lncurses
#CXX_FLAGS+=-gddb -Wall
CXX_FLAGS+=-DDEBUG -Wall
#CXX_FLAGS+=-pg
#LD_FLAGS+=-pg

install:
    mkdir -p /usr/local/bin
    cp bastet /usr/local/bin/
    chmod 755 /usr/local/bin/bastet
```

```

root@bad:/home/vr61v/lab3/bastet/bastet-0.43# make install
mkdir -p /usr/local/bin
cp bastet /usr/local/bin/
chmod 755 /usr/local/bin/bastet
root@bad:/home/vr61v/lab3/bastet/bastet-0.43# ls /usr/local/bin/
bastet
root@bad:/home/vr61v/lab3/bastet/bastet-0.43# ls -la /usr/local/bin/
total 744
drwxr-xr-x  2 root root  4096 Mar 15 12:36 .
drwxr-xr-x 10 root root  4096 Feb  7 09:52 ..
-rwxr-xr-x  1 root root 795712 Mar 15 12:36 bastet

```

8. Создайте файл **task10.log**, в который выведите список всех установленных пакетов.

```
vr61v@bad:~/lab3$ apt list --installed >> task10.log
```

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

```

vr61v@bad:~/lab3$ ls
bastet  bastet-0.43  bastet_0.43-7.debian.tar.xz  bastet_0.43-7.dsc  bastet_0.43.orig.tar.gz  task10.log
vr61v@bad:~/lab3$ cat task10.log
Listing...
accountsservice/stable,now 22.08.8-6 arm64 [installed,automatic]
acl/stable,now 2.3.1-3 arm64 [installed,automatic]
adduser/stable,now 3.134 all [installed]
adwaita-icon-theme/stable,now 43-1 all [installed,automatic]
aisleriot/stable,now 1:3.22.23-1 arm64 [installed,automatic]
alsa-topology-conf/stable,now 1.2.5.1-2 all [installed,automatic]
alsa-ucm-conf/stable,now 1.2.8-1 all [installed,automatic]
alsa-utils/stable,now 1.2.8-1 arm64 [installed,automatic]

```

9. Создайте файл **task11.log**, в который выведите список всех пакетов (зависимостей), необходимых для установки и работы компилятора **gcc**.

```

vr61v@bad:~/lab3$ apt-cache depends gcc >> task11.log
vr61v@bad:~/lab3$ ls
bastet  bastet-0.43  bastet_0.43-7.debian.tar.xz  bastet_0.43-7.dsc  bastet_0.43.orig.tar.gz  task10.log  task11.log
vr61v@bad:~/lab3$ cat task11.log
gcc
Depends: cpp
Depends: gcc-12
Conflicts: <gcc-doc>
Recommends: libc6-dev
Recommends: <libc-dev>
  libc6-dev
Suggests: <gcc-multilib>
Suggests: make
  make-guile
Suggests: manpages-dev
Suggests: autoconf
Suggests: automake
Suggests: libtool
Suggests: flex
Suggests: bison
Suggests: gdb
  gdb-minimal
Suggests: <gcc-doc>

```

10. Создайте файл **task12.log**, в который выведите список всех пакетов (зависимостей), установка которых требует установленного пакета **libgpm2**.

```

vr61v@bad:~/lab3$ apt-cache rdepends libgpm2 >> task12.log
vr61v@bad:~/lab3$ ls
baste0_0.43-7.debian.tar.xz  baste0_0.43-7.dsc  baste0_0.43.orig.tar.gz  task10.log  task11.log  task12.log
vr61v@bad:~/lab3$ cat task12.log
libgpm2
Reverse Depends:
  libgpm-dev
  zhcon
  xwpe
  xemacs21-nomule
  xemacs21-mule-canna-wnn
  xemacs21-mule
  w3m
  vim-nox
  vim-motif
  vim-gtk3
  vim
  libncursesw6
  libncursesw5
  libncurses6
  libncurses5
  mc
  links2
  links
  libt3widget2
  jed
  libaa1
  gpm
  fte-console
  libfinal0
  emacs-nox
  emacs-lucid
  emacs-gtk
  elinks
  brlty
  aumix-gtk
  aumix

```

11. Создайте каталог **localrepo** в домашнем каталоге пользователя root и скопируйте в него с сайта <http://snapshot.debian.org/package/htop/> пять разных версий пакета **htop**. Это можно сделать с помощью **wget** или просто передав файлы на виртуальную машину используя протокол **ssh** и утилиту **scp**.

```

root@bad:~/localrepo$ wget http://snapshot.debian.org/archive/debian/20250312T144852Z/pool/main/h/htop/htop_3.4.0-2_arm64.deb
--2025-03-15 13:17:11-- http://snapshot.debian.org/archive/debian/20250312T144852Z/pool/main/h/htop/htop_3.4.0-2_arm64.deb
Resolving snapshot.debian.org (snapshot.debian.org)... 151.101.2.132, 151.101.66.132, 151.101.130.132, ...
Connecting to snapshot.debian.org (snapshot.debian.org)[151.101.2.132]:80... connected.
HTTP request sent, awaiting response... 302 FOUND
Location: /file/2521ed0f9f21a70b4662e707f539943403886132/htop_3.4.0-2_arm64.deb [following]
--2025-03-15 13:17:11-- http://snapshot.debian.org/file/2521ed0f9f21a70b4662e707f539943403886132/htop_3.4.0-2_arm64.deb
Reusing existing connection to snapshot.debian.org:80.
HTTP request sent, awaiting response... 200 OK
Length: 160088 (156K)
Saving to: 'htop_3.4.0-2_arm64.deb'

htop_3.4.0-2_arm64.deb 100%[=====] 156.34K 594KB/s in 0.35
2025-03-15 13:17:11 (594 KB/s) - 'htop_3.4.0-2_arm64.deb' saved [160088/160088]

root@bad:~/localrepo$ ls
htop_2.2.0-1_arm64.deb  htop_3.2.0-1_arm64.deb  htop_3.3.0-1_arm64.deb  htop_3.4.0-1_arm64.deb  htop_3.4.0-2_arm64.deb

```

12. Сгенерируйте в каталоге репозитория файл Packages, который будет содержать информацию о доступных пакетах в репозитории и файл Создайте файл Release, содержащий описание репозитория. Например:

```

root@bad:/home/vr61v/localrepo# dpkg-scanpackages -m ./ | gzip | sudo tee Packages.gz > /dev/null
dpkg-scanpackages: info: Wrote 5 entries to output Packages file.
root@bad:/home/vr61v/localrepo# ls -la
total 712
drwxr-xr-x  2 vr61v vr61v  4096 Mar 15 19:08 .
drwxr-xr-x 19 vr61v vr61v  4096 Mar 15 14:54 ..
-rwxr-xr-x  1 vr61v vr61v  82120 Mar 15 14:54 htop_2.2.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 145712 Mar 15 14:54 htop_3.2.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 154620 Mar 15 14:54 htop_3.3.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 160080 Mar 15 14:54 htop_3.4.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 160088 Mar 15 14:54 htop_3.4.0-2_arm64.deb
-rwxr-xr-x  1 vr61v vr61v  1054 Mar 15 19:13 Packages.gz

```

```

root@bad:/home/vr61v/localrepo# ls
htop_2.2.0-1_arm64.deb  htop_3.2.0-1_arm64.deb  htop_3.3.0-1_arm64.deb  htop_3.4.0-1_arm64.deb  htop_3.4.0-2_arm64.deb  Packages.gz  Release
root@bad:/home/vr61v/localrepo# ls -la
total 716
drwxr-xr-x  2 vr61v vr61v   4096 Mar 15 19:46 .
drwxr-xr-x 19 vr61v vr61v   4096 Mar 15 19:30 ..
-rwxr-xr-x  1 vr61v vr61v  82120 Mar 15 14:54 htop_2.2.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 145712 Mar 15 14:54 htop_3.2.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 154620 Mar 15 14:54 htop_3.3.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 160080 Mar 15 14:54 htop_3.4.0-1_arm64.deb
-rwxr-xr-x  1 vr61v vr61v 160088 Mar 15 14:54 htop_3.4.0-2_arm64.deb
-rwxr-xr-x  1 vr61v vr61v   1054 Mar 15 19:13 Packages.gz
-rwxr-xr-x  1 vr61v vr61v    291 Mar 15 19:46 Release
root@bad:/home/vr61v/localrepo# cat Release
Origin: localrepo
Label: localrepo
Suite: stable
Version: 1.0
Codename: myrepo
Architectures: arm64
Description: localrepo
Date: Sat, 15 Mar 2025 23:42:01 +0000
MD5Sum:
7e95eb6dc59186dcbab93d2e2e5ca090      1054 Packages.gz
330267f16b934bb5ea5250e83fc74c12      38 Release

```

13. Обновите кэш apt

```

root@bad:/home/vr61v/localrepo# apt update
Get:1 file:/home/vr61v/localrepo ./ InRelease
Ign:1 file:/home/vr61v/localrepo ./ InRelease
Get:2 file:/home/vr61v/localrepo ./ Release [291 B]
Get:2 file:/home/vr61v/localrepo ./ Release [291 B]
Get:3 file:/home/vr61v/localrepo ./ Release.gpg
E: Repository 'file:/home/vr61v/localrepo ./ Release' changed its 'Origin' value from 'my local repo' to 'localrepo'
E: Repository 'file:/home/vr61v/localrepo ./ Release' changed its 'Label' value from 'my local repo' to 'localrepo'
N: This must be accepted explicitly before updates for this repository can be applied. See apt-secure(8) manpage for details.
Do you want to accept these changes and continue updating from this repository? [y/N] y

```

14. Выведите список подключенных репозиториях и краткую информацию о них.

```

root@bad:/home/vr61v/localrepo# apt-cache policy
Package files:
100 /var/lib/dpkg/status
   release a=now
500 file:/home/vr61v/localrepo ./ Packages
   release v=1.0,o=localrepo,a=stable,n=myrepo,l=localrepo,c=
500 http://deb.debian.org/debian bookworm-updates/main arm64 Packages
   release v=12-updates,o=Debian,a=stable-updates,n=bookworm-updates,l=Debian,c=main,b=arm64
   origin deb.debian.org
500 http://security.debian.org/debian-security bookworm-security/main arm64 Packages
   release v=12,o=Debian,a=stable-security,n=bookworm-security,l=Debian-Security,c=main,b=arm64
   origin security.debian.org
500 http://deb.debian.org/debian bookworm/main arm64 Packages
   release v=12.10,o=Debian,a=stable,n=bookworm,l=Debian,c=main,b=arm64
   origin deb.debian.org
Pinned packages:

```

15. Создайте файл task16.log в который выведите список всех доступных версий htop

```

root@bad:/home/vr61v/lab3# apt-cache policy htop > task16.log
root@bad:/home/vr61v/lab3# ls
bastet  bastet-0.43  bastet_0.43-7.debian.tar.xz  bastet_0.43-7.dsc  bastet_0.43.orig.tar.gz  task10.log  task11.log  task12.log  task16.log
root@bad:/home/vr61v/lab3# cat task16.log
htop:
  Installed: (none)
  Candidate: 3.4.0-2
  Version table:
   3.4.0-2 500
     500 file:/home/vr61v/localrepo ./ Packages
   3.4.0-1 500
     500 file:/home/vr61v/localrepo ./ Packages
   3.3.0-1 500
     500 file:/home/vr61v/localrepo ./ Packages
   3.2.2-2 500
     500 http://deb.debian.org/debian bookworm/main arm64 Packages
   3.2.0-1 500
     500 file:/home/vr61v/localrepo ./ Packages
   2.2.0-1 500
     500 file:/home/vr61v/localrepo ./ Packages

```


16. Установите предпоследнюю версию пакета

Из-за проблем с библиотекой libc6 (версия не подходит для 3.4.0-1) пришлось установить 3-ю библиотеку по счету, а не предпоследнюю.

```
root@bad:/home/vr61v/lab3# apt install htop=3.3.0-1
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  linux-image-6.1.0-29-arm64
Use 'apt autoremove' to remove it.
Suggested packages:
  lm-sensors strace
The following NEW packages will be installed:
  htop
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0 B/155 kB of archives.
After this operation, 471 kB of additional disk space will be used.
Get:1 file:/home/vr61v/localrepo ./ htop 3.3.0-1 [155 kB]
Selecting previously unselected package htop.
(Reading database ... 183959 files and directories currently installed.)
Preparing to unpack ..././htop_3.3.0-1_arm64.deb ...
Unpacking htop (3.3.0-1) ...
Setting up htop (3.3.0-1) ...
Processing triggers for mailcap (3.70+nmu1) ...
Processing triggers for desktop-file-utils (0.26-1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1.1) ...
Processing triggers for man-db (2.11.2-2) ...
```

17. Скачайте из сетевого репозитория пакет **nano**. Пересоберите пакет таким образом, чтобы после его установки, появлялась возможность запустить редактор **nano** из любого каталога, введя команду **newnano**. Для работы с пакетом следует использовать **dpkg-deb**, а для установки **dpkg**. В файле протокола работы опишите использованные команды.

Для выполнения этого этапа я использовал команды:

- `apt download nano` – для скачивания пакета nano
- `Dpkg-deb -R <скаченный пакет> newnano`
- Перешел в папку bin и сделал символическую ссылку `ln nano newnano`
- Перешел обратно в папку с скаченным пакетом и сделал пересборку пакета `dpkg-deb -b newnano newnano.deb`
- Далее перешел в su и запустил команду установки пакета `dpkg -i newnano`