Yocto

1) create layers?

We need to modify the build/conf/bblayer.conf file to add the layer location, using its absolute path.
"/home/user/yocto/poky/meta-openembedde/meta-oe\"
command:
$ bitbake-layers create-layers ../source/<layername>
$bitbake-layers add-layers ../source/<layer-name>
After creating the layer, we need to include it in the build/conf/bblayers.conf file using the following command:
$ bitake-layers create-layer /home/user/yocto/source/meta-newlayer

2) create customized image?
$ bitake-layers create-layer /home/user/yocto/poky/meta-newlayer
$ bitbake-layers add-layer ../meta-openembedded/meta-oe

3) what is bitbake?
The BitBake task scheduler which is similar to make command
BitBake is responsible for running as many tasks as possible in parallel while ensuring they are run respecting their dependencies

4) What are bitbake tasks?
do_fetch()
do_unpack()
do_patch()
do_configure()
do_compile()
do_install()
do_package()
5) how you generate you own package?
Step 1: Choose a Directory Structure
Step 2: Create a Layer Configuration File
Step 3: Create a Recipe

```
SUMMARY = "Description of your package"

LICENSE = "MIT"

LIC_FILES_CHKSUM = "file://COPYING;md5=..."

SRC_URI = "file://mysourcefile.c"


S = "${WORKDIR}"


do_compile() {

   # Add compile instructions here

}
```

```
do_install() {
    # Add installation instructions here
    install -d ${D}${bindir}
    install -m 0755 ${S}/mysourcefile ${D}${bindir}
}
```

Step 4: Add the Layer to `bblayers.conf`

```
BBLAYERS ?= " \
  /path/to/poky/meta \
  /path/to/poky/meta-poky \
  /path/to/poky/meta-yocto-bsp \
  /path/to/meta-custom \
"
```

Step 5: Build the Image

```
$ bitbake core-minimal-image
```

6) how can you add your own task in bitbake?

$ bitbake <recipe> -c <task>

7) images location?

build/tmd/deploy/images/

8) what is sdk and how you compile it?

It contains a set of tools,libraries,and file to develop and debug the applications.

The tools contains of compilers,linkers,debuggers,headers and binaries.

9) compile kernel using bitbake?

$ bitbake virtual/kernel -c menuconfig

$ bitbake virtual/kernel -c diffconfig

10) Depends and Rdepends?

RDEPENDS: The list of packages must be available at runtime, along with the package that

defines it.

DEPENDS: These dependencies are crucial for the build process, and Yocto ensures that the necessary dependencies are built first, in the correct order.

11) If I am compiling the kernel what is the function of do _configure?

The do_configure task is critical because it allows the user or the build system to customize the kernel configuration based on the specific requirements of the target system. Configuration options can include things like hardware architecture, device drivers, filesystem support, networking options, and more.

In Yocto recipes for the Linux kernel (typically defined in .bb files), you might see something like this:

```
do_configure() {
    oe_runmake menuconfig
}
```

or

```
do_configure
 # Configure the kernel (e.g., copy a defconfig) cp ${WORKDIR}
    ${S}
```

12) What is yocto project?

It is a open source collaboration project whict provides tools, templetes, methods that helps developers to create custom linx based system that are designed for embedded products.

13) what is the use of SRC_REV variable?

The purpose of the SRCREV variable in a Yocto Project recipe is to specify a

specific revision (commit) of the source code repository that should be used for building

the recipe.

14) what is metadata?

It is a set of data that describes and gives information about other data.

It is a collection of configuration files,recipes,classes,includes.

15) write a recipe for git remote repository?

Yocto supports the ability to pull code from online git repositories as part of the build process.

Step 1: Set SRC_URI

SRC_URI = "git://<URL>;protocol=https"

Step 2: Set S environmental variable

S = "${WORKDIR}/git"

Step 3: Set SRCREV environmental variable

16) how do you add particular package in rootfs?

Vi conf/local.conf

add the recipe name

IMAGE_INSTALL +=”recipe_name” or

IMAGE_INSTALL_APPEND =”recipe_name”

17)What is PROVIDES list?

A PROVIDES list is the list of names by which the recipe can be known.

By default, the PN is added automatically into the PROVIDES list.

PROVIDES += "virtual/httpd"

18) What is recipe?

It is a set of instructions that is processed by bitbake and its extension is .bb file

19) What is class files?

Class file are used to abstract common functionality and share it amongst multiple recipe files and extension is .bbclass

20) what is the function of dev_packages?

Installs development packages (headers and extra library links) for all packages

installed in a given image.

21) what is distribution?

The distribution is where we define global options, such as the toolchain version, graphical backends,

and support for OpenGL. We should make a distribution only if the default settings provided by Poky

fail to fulfill our requirements.

22) what is variables?

Variables defined in configuration files are global to every recipe, also referred to as configuration metadata. The parsing order of the main configuration files is shown as follows:

build/conf/local.conf

<layer>/conf/machines/<machine>.conf

<layer>/conf/distro/<distro>.conf

Variables defined within recipe files have recipe visibility scope that is local to the specific recipe only during the execution of its tasks.

23) HOW TO ADD MY-DISTRIBUTION IN NEW LAYER?

create the new layer;

create the distro directory in the <layer>/conf/distro/my-distro

create the distro name

24) what is layer version give example?

LAYERVERSION: This is an optional variable that specifies the version of the layer in a single number.

Ex: LAYERVERSION_meta-newlayer = "1".

25) how do you check the value of a variable?

Bitbake -e <rcipename> | grep ^variablename=

26) write a simple hello world recipe?

DESCRIPTION = "Simple helloworld application"

LICENSE = "MIT"

LIC_FILES_CHKSUM = "file://${COMMON_LICENSE_DIR}/MIT;md5=0835ade698e0bcf8506ecda2f7b4f302"

SRC_URI = "file://userprog.c"

S = "${WORKDIR}"

do_compile() {

```
    ${CC} userprog.c ${LDFLAGS} -o userprog
}


do_install() {
    install -d ${D}${bindir}
    install -m 0755 userprog ${D}${bindir}
}
```

27) what is the function of inherit?

In Yocto Project, "inherit" is a keyword used in the recipe files to include functionality from one or more classes into another.

28) what ais debug-tweaks?

This feature enables passwordless login for root user

29) what is the function of splash?

Enables you to show a splash screen during boot. By default this screen is provided by psplash which does allow customization.

30) how do you apply a patch in an existing recipe?

FILESEXTRAPATHS:prepend := “${THISDIR}/${PN}-${PV}:”

SRC_URI += “files://<patch_file>”

31) why autotools?

It is used for building native programs on the build machine and also cross compiling to other architectures

32) what is cmake?
It is a cross platform free and open source software tool for managing the build process of software using a compiler independent method.

33) what is devshell?
It is a terminal shell that runs in the same context as bitbake task engine.
$ bitbake -c devshell <recipe_name>

34) what are the different types of layers in yocto?
Board support package layer meta-yocto-bsp
oe-core layer meta-oe
application layer

35) How do you change the priority of a layer using script?
$bitbake-layers create-layer -p <priority> ../source/meta-mylayer

36) what is the difference between source and build folder?

Source: The source folder contains the original source code of the software component being built. It is where the Yocto build system fetches the source code, extracts it, and performs various tasks such as configuring, patching, and compiling.

Build: The build folder is where the build system performs the actual compilation and builds the software. It is separate from the source folder to keep the original source code

unchanged, allowing for reproducible builds and easier management of multiple build configurations.

37) what is devtool and write a recipe using devtool?
Devtool is a tool that simplifies the process of developing and maintaining recipes for software components. It provides a set of commands to assist developers in tasks such as creating new recipes, modifying existing ones, and enabling quicker iteration during the development process.
DESCRIPTION = "Hello World Program"

SECTION = "examples"

LICENSE = "CLOSED"

SRC_URI = "git://example.com/hello-world.git"

inherit autotools

38) How to compile the kernel only ?

export MACHINE=your-machine

bitbake linux-yocto -c compile -f

39)Command for compiling a part of kernel?

bitbake kernel-module-example -c compile -f

bitbake virtual/kernel -c menuconfig

bitbake virtual/kernel -c compile -f

or

bitbake linux-yocto

bitbake linux-yocto -c compile -f

bitbake linux-yocto -c menuconfig

bitbake linux-yocto -c cleansstate

bitbake linux-yocto -c compile -f -C <module-directory>