

Virtual System and Services - Simplified Solutions

PAPER 1 SOLUTIONS (VS Paper 1)

Q1. Compile C program using GCC on Ubuntu:

1. Open Terminal
2. cd Desktop
3. nano hello.c
4. Code:

```
#include <stdio.h>
```

```
int main() {
```

```
    printf("Hello, world!\n");
```

```
    return 0;
```

```
}
```

5. Save: Ctrl + O, Enter, then Ctrl + X
6. Compile: gcc hello.c -o hello
7. Run: ./hello

Why GCC instead of Turbo C?

- GCC is modern, updated, cross-platform.
- Turbo C is outdated and not compatible with modern systems.

Q2. Deploy Java using Google App Engine (GAE):

1. Open Cloud Shell at <https://console.cloud.google.com>
2. gcloud init
3. gcloud components install app-engine-java
4. gcloud app create

5. nano HelloApp.java, add code and compile
6. git clone <https://github.com/username/repo.git>

Q3. Docker Deployment:

1. Install Docker Desktop
2. Create HelloDocker.java, compile it
3. Create Dockerfile with:

```
FROM openjdk:11
```

```
COPY HelloDocker.class .
```

```
CMD ["java", "HelloDocker"]
```

4. docker build -t javaapp .
5. docker run javaapp

PAPER 2 SOLUTIONS (VS Paper 2)

Q1. GCC C program in files directory:

```
cd ~/files
```

```
nano myprogram.c
```

Add code, compile with gcc, run with ./myprogram

Ubuntu Commands:

ls, pwd, mkdir, rm, sudo apt install gcc

Q2. GAE Web App using Python Flask:

```
gcloud init
```

```
mkdir mywebapp && cd mywebapp
```

```
nano app.yaml and main.py
```

pip install flask

gcloud app deploy

gcloud app browse

Q3. Virtual Machine & Hypervisor:

Install VirtualBox, create VM with settings

Type 1: Bare-metal (direct hardware)

Type 2: Hosted (inside OS)

PAPER 3 SOLUTIONS (VS Paper 3)

Q1. Virtualization:

Use VirtualBox/VMware to create VM

Hypervisors:

- Type 1 (bare-metal): fast, used in servers
- Type 2 (hosted): easy to use, for desktops

Q2. Hadoop, Oracle, GitHub, Clone with Cloud:

- Install Java, download Hadoop, set env vars
- Oracle: sign up at oracle.com, fill info
- GitHub: version control, team collaboration
- Clone repo in Cloud Shell:

```
git clone https://github.com/username/repo.git
```

Q3. Containerization:

- Package app with its dependencies in one container
- Tools: Docker, Kubernetes

- Benefits: portable, consistent, efficient, scalable