CS 544 (Fall 2025): In-Person Quiz 1 (Version A)

Full Name: _____

Student ID Number: _____

1. Which Linux command often gives documentation similar to what you get by running "--help" after the command name?
   (A) bat (B) cat (C) dog (D) man
2. What languages are usually executed as bytecode running on a virtual machine?
   (A) only Java (B) only Python (C) Java and Python
3. Say a server can handle uploads of 100 MB/s. What kind of measurement is this?
   (A) capacity (B) latency (C) throughput
4. Say you use "docker logs -f" to observe a Dockerized process. What command is most similar if you want to run a process P without Docker? P's output is redirected to out.txt.
   (A) cat -logs out.txt (B) logs out.txt (C) logs -tail out.txt (D) tail -f out.txt
5. If you want to look around inside an already running container, what is most useful?
   (A) docker exec (B) docker ps (C) docker run (D) docker system df
6. Which of the following IP addresses corresponds to the loopback (lo) interface?
   (A) 0.0.0.0 (B) 10.128.4.5 (C) 34.204.75.22 (D) 127.0.0.1
7. When your application is a conferencing software, like Zoom, which transport protocol would be preferable?
   (A) TCP (B) UDP
8. What does the following command do?
   ```
   python3 -m grpc_tools.protoc -I=. --python_out=.
   --grpc_python_out=. math.proto
   ```
   (A) generates .yml files from a .py file
   (B) generates .py files from a .proto file
   (C) generates .proto files from a .py file
   (D) generates .yml files from a .proto file
9. Suppose you have launched a container with the port forwarding option "-p 127.0.0.1:3000:4000", which runs a gRPC server. Then, you have established an ssh tunnel using -L localhost:2000:localhost:3000. What port is the gRPC server listening to?
   (A) 127 (B) 2000 (C) 3000 (D) 4000
10. If you only want to see the active containers that are part of a compose cluster, which of the following commands should you use?
    (A) docker ps (B) docker compose ls -l (C) docker compose ps (D) docker ps -a

Question 11 (5 points). Consider the shell command, and illustrate it in the area below:

```
A && B | C &> D
```

We have already drawn process A for you. Draw boxes for B, C, and D in the appropriate areas (depending on whether they are programs or files). Label stdin, stdout, and stderr for any processes. Draw arrows to illustrate how data flows through the system, between processes and files. Draw an asterisk/star (*) inside any process that runs asynchronously (if any). Assume all the processes run without error and exit normally.

Question 12 (5 points). Consider the following shell commands, and illustrate below how traffic flows from your laptop browser to the virtual machine to the docker container(s).

```
docker run -d -p 127.0.0.1:7000:8000 demo # Virtual machine
docker run -d -p 127.0.0.1:3000:4000 demo # Virtual machine
ssh <user>@<VM_name> -L localhost:6000:localhost:7000 # Laptop
# open http://localhost:6000 in browser on Laptop
```

Be sure to label port numbers on interfaces (IF), when known. Arrow directions should indicate whether a process is listening on a port (port => process) or sending to a port (process => port).