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**Course Name:** Computer Networks

**Assignment Title:** Assignment#0

**Date:** Sep-14-2025

**Statement:**  I, Joseph MUTANGANA, confirm that results on this report is my own, and I understand that violating academic and course integrity results punishments.

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# **Task A – DoD (TCP/IP) vs OSI model**

a) DoD (TCP/IP) Model – Four Layer

Application Layer (DoD)

Functionality

Typical protocol & services

Example real world operation

Transport Layer (DoD)

Functionality

Typical protocol & services

Example real world operation

Internet Layer (DoD)

Functionality

Typical protocol & services

Example real world operation

Network Access / Link Layer (DoD)

Functionality

Typical protocol & services

Example real world operation

b) Compare DoD vs OSI – structural & functionality differences

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **OSI 7 Layer** | **TCP (DoD) 4 Layer** | **Difference** |
| 7 | Application | Application |  |
| 6 | Presentation |  |
| 5 | Session |  |
| 4 | Transport | Transport |  |
| 3 | Network | Internet |  |
| 2 | Data Link | Network Access |  |
| 1 | Physical |  |

c) Inclusions per layer

d) OSI Model in Depth (7 layers with real-life examples)

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Layer** | **Definition** | **Real-Life Example** |
| 7 | Application |  |  |
| 6 | Presentation |  |  |
| 5 | Session |  |  |
| 4 | Transport |  |  |
| 3 | Network |  |  |
| 2 | Data Link |  |  |
| 1 | Physical |  |  |

Diagram shows how data moves from sender to receiver

# **Task B – TCP vs UDP**

a) Transmission Control Protocol (TCP)

b) User Datagram Protocol (UDP)

c) Compare & Contrast

|  |  |  |
| --- | --- | --- |
| **Feature** | **Transmission Control (TCP)** | **User datagram protocol (UDP)** |
| Reliability |  |  |
| Ordering |  |  |
| Overhead |  |  |
| Latency |  |  |
| Typical use cases |  |  |
| Error correction handling mechanism |  |  |

# **Task C – Module-by-Module Reflection (17 modules)**

Module 1: Communication in a connected world

a) Observation

In network types, I saw that Internet is not owned by an individual or group, but is worldwide.

In data transmission, I saw categories of personal data such as Volunteered data, Observed data, and inferred data

In Bandwidth and Throughput, I saw that bandwidth is measurement of amount of data that flow from one place to another.

While Throughput measures all data being sent and received including latency/delay of data flows from one place to another.

b) Real World example

Transferring file between devices like two phones, then phone A is about to send music file to phone B with specific amount of that file. Bandwidth will track how much amount of file/Kbps is being transferred from A to B in seconds.

c) one question or idea

Why do we need to connect the world?

d) Key takeaway

* Internet is not physical connection in real world. It is the place people go to find or share information.
* Internet is not owned by an individual or a group. It is worldwide collection of interconnected networks
* Bandwidth is measurement of amount of data flows from one place to another.
* Throughput is measurement of amount of data between one to another including delays.

Module 2: Network Components, Types and Connections

a) Observation

In Clients and Servers, I saw that computers connected to a network that participates directly in a network communication are classified as host. The software installed on computer determines which role the computer will plays. Client can work as server and server work as client that called peer-to-peer network.

In Network components, I saw that the network infrastructure has three categories such as End devices, intermediary devices, and network devices.

ISP Connectivity Option, An ISP provides the link between the home network and the internet.

b) Real World example

Network components used in many places such as home, offices, schools, etc. At home I may use my phone, Television, and Router also at office they make network and connect to internet by using network components

c) one question or idea

d) Key takeaway

* Different between server and client
* Definition of peer-to-peer network
* ISP provides the link between network and the internet
* DSL (Digital Subscriber Line

Module 3: Wireless and Mobile Networks

a) Observation

b) Real World example

c) one question or idea

d) Key takeaway

Module 4: Build Home Networks

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 5: Communication Principles

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 6: Network Media

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 7: The Access Layer

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 8: The Internet Protocol

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 9: IPv4 and Network Segmentation

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 10: IPv6 Addressing Formats and Rules

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 11: Dynamic Addressing with DHCP

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 12: Gateway to Other Networks

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 13: The ARP Process

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 14: Routing Between Networks

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 15: TCP and UDP

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 16: Application Layer Services

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

Module 17: Network Testing Utilities

a) Core Concept:

b) What I observed

c) Real World example

d) one question or idea

e) Key takeaway

# **Task D – Network Topologies**

Bus

Definition

Diagram

Device 1

Device 2

Device 3

Device 6

Device 4

Device 5

How it operates

Real World uses and examples

Advantages & Disadvantages

Observation

Recommendation

Ring

Definition

Diagram

How it operates

Real World uses and examples

Advantages & Disadvantages

Observation

Recommendation

Mesh

Definition and diagram

How it operates

Real World uses and examples

Advantages & Disadvantages

Observation

Recommendation

Star

Definition and diagram

How it operates

Real World uses and examples

Advantages & Disadvantages

Observation

Recommendation

Hybrid

Definition and diagram

How it operates

Real World uses and examples

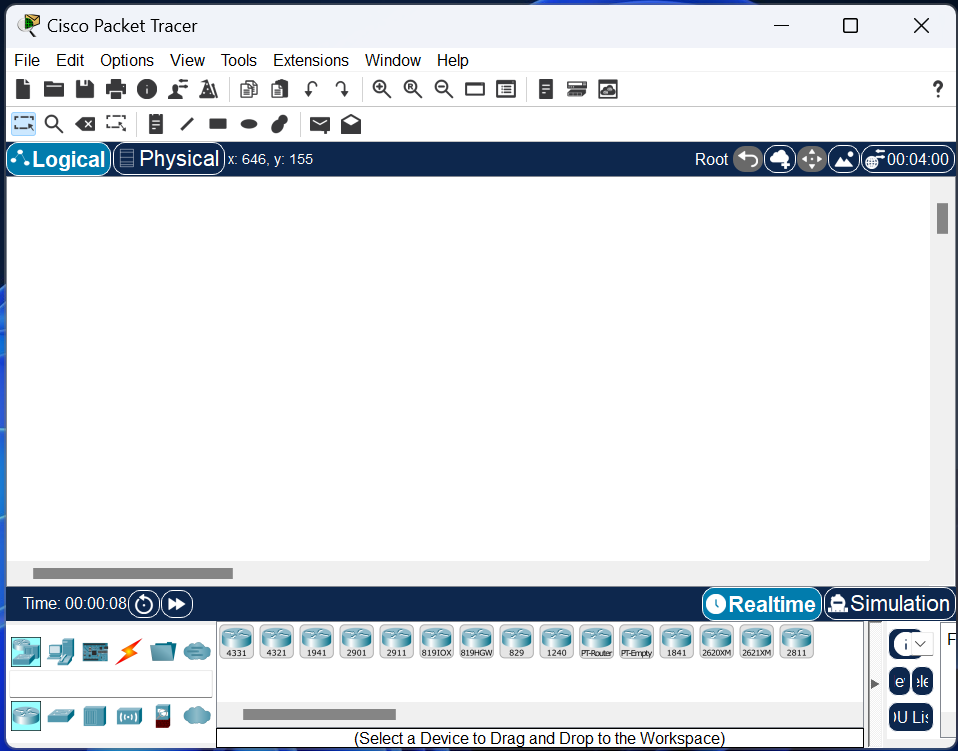
Advantages & Disadvantages

Observation

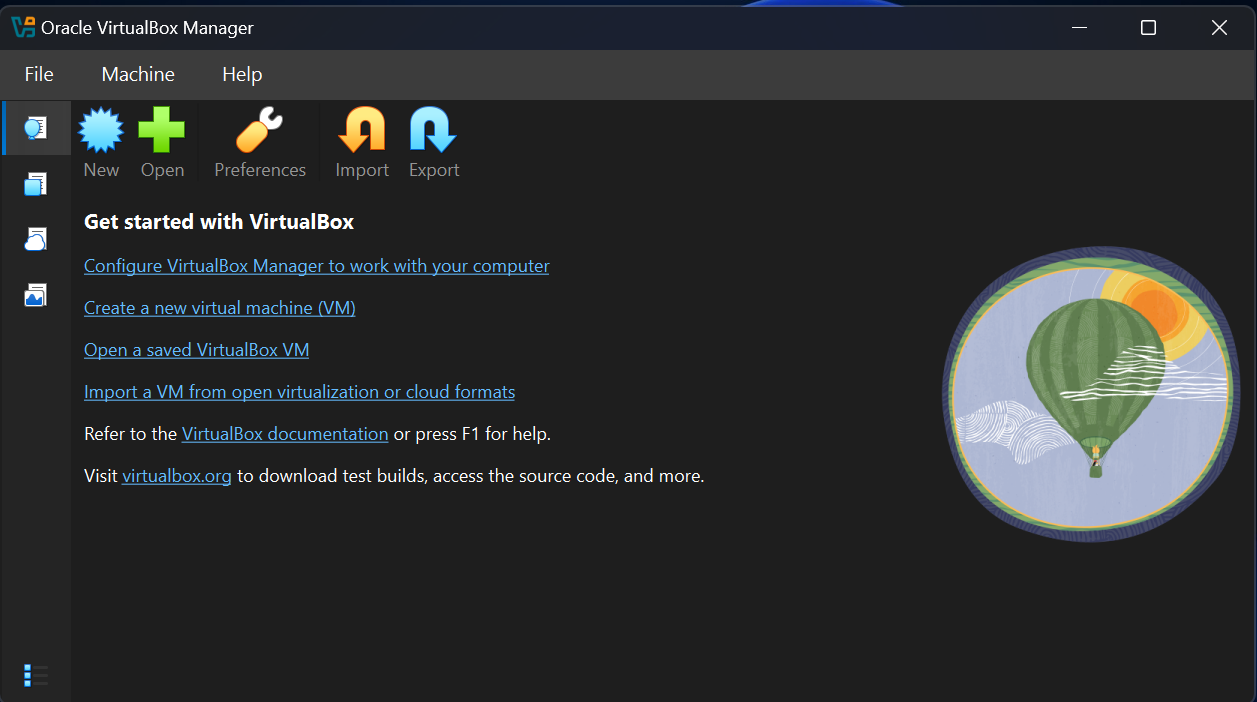
Recommendation

# **Task E – Installation evidence**

Packet Tracer

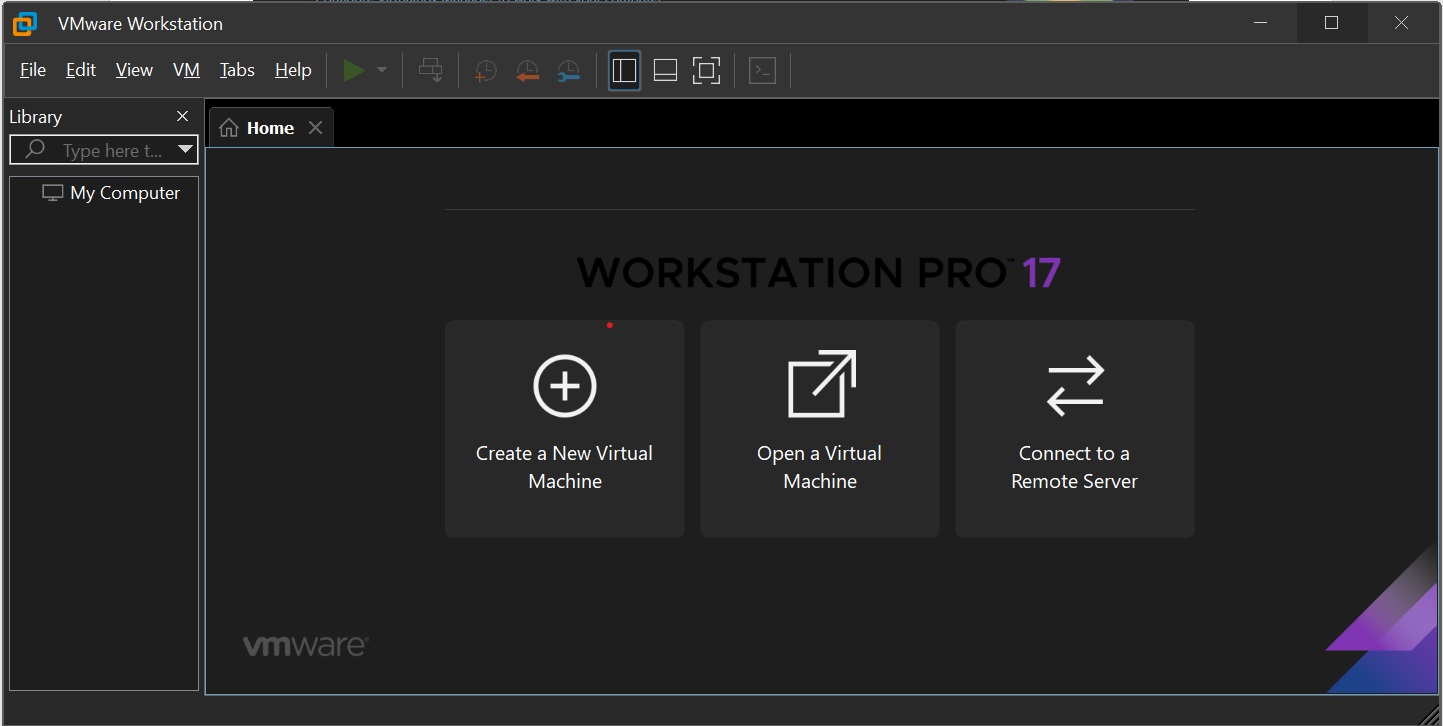


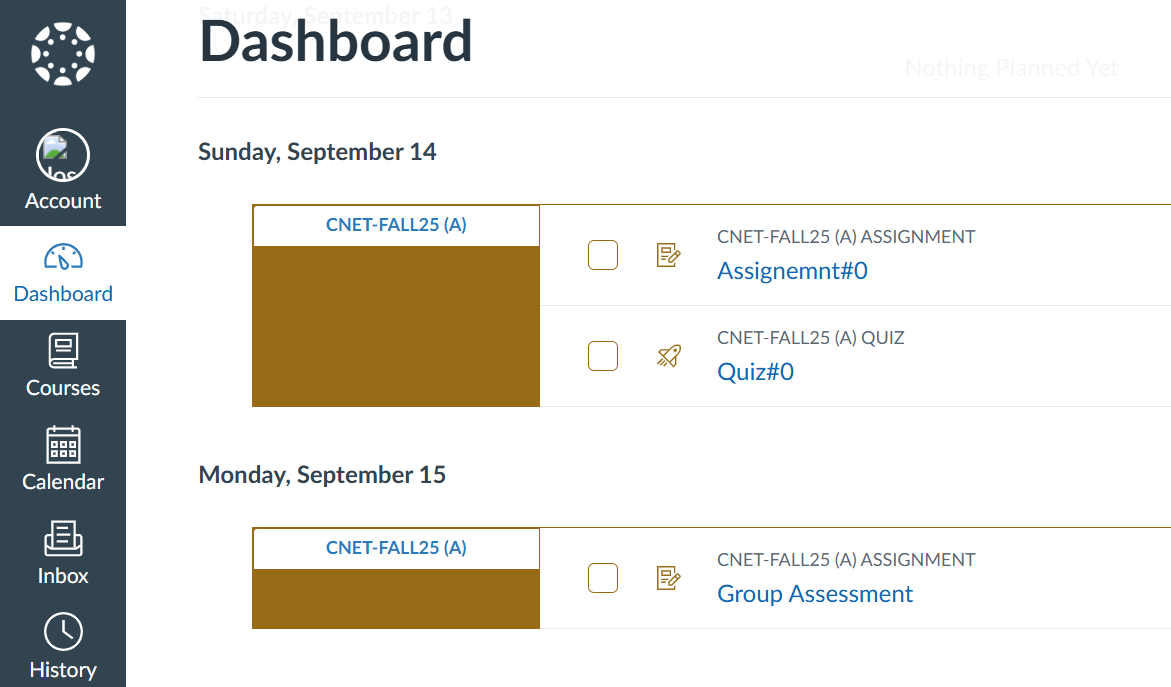
Virtual-Box



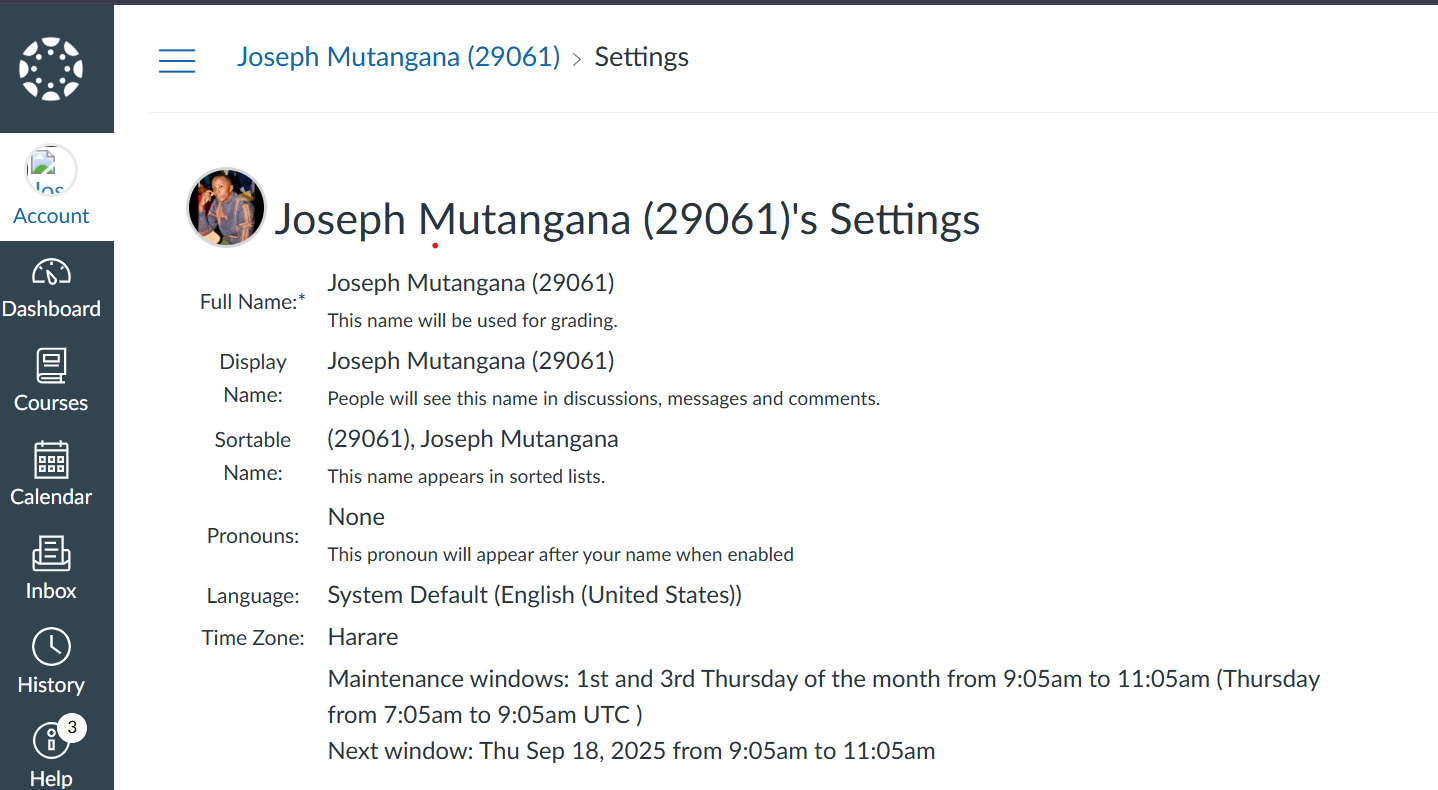
EVE-NG (Community Edition)

VMware Workstation Player / Pro



Computer Networks Course Enrollment on Canvas 

Canvas Profile



# **Task F - Networking Basic course evidence**

# **Task G – Agreements & Commitment Plan**

* I, Joseph MUTANGANA – 29061, commit to attend classes, participate actively, follow instructor directions, and complete assignments on time.
* I will maintain academic integrity: submit original work, cite sources, and avoid plagiarism.
* I will avoid distractions in class (like using phone or any unrelated activities).
* I understand consequences for violations (grade penalties, academic review) and accept them.

# **Appendices**