**Homework 1:**

The documents consist of various models simulated for varying configurations. Given below are four simulation results performed using different heuristics. Parameters and their values used in each simulation is mentioned in the table

**CONFIGURATION DETAILS:**

**Simulation 1:**

|  |  |
| --- | --- |
| Number of Datacenters | 1 |
| Number of Hosts | 4 |
| Number of VMs | 16 |
| Number of hosts PE | 6 |
| Number of VM PE | 1 |
| VM Scheduling Policy | Time Shared |
| Cloudlet Scheduling Policy | Time Shared |
| VM Allocation Policy | First Fit |
| Utilization model | Full(100%) |

**The result of Simulation 1:**

A picture containing window, computer

Description automatically generated

A screenshot of a computer

Description automatically generated

**Simulation 2:**

|  |  |
| --- | --- |
| Number of Datacenters | 1 |
| Number of Hosts | 4 |
| Number of VMs | 16 |
| Number of hosts PE | 6 |
| Number of VM PE | 1 |
| VM Scheduling Policy | Time Shared |
| Cloudlet Scheduling Policy | Time Shared |
| VM Allocation Policy | Round Robin |
| Utilization model | Full(100%) |

**The result of Simulation 2:**

A picture containing window, large, computer, table

Description automatically generated

A screenshot of a computer

Description automatically generated

The two simulations (1 and 2) show how different VM allocation policy affect the assignment of VM to the hosts and in turn the scheduling of the cloudlets. First Fit allocation policy tries to assign VM to the First Host which satisfies the requirements of the VM whereas Round robin selects a VM in cyclic manner. Once a VM is allocated to the host, it moves to the next host for assigning the next VM. This way it activates the inactive host and increases the power consumption of the datacenter. Thus, First Fit performs optimally in comparison with Round Robin.

**Simulation 3:**

|  |  |
| --- | --- |
| Number of Datacenters | 1 |
| Number of Hosts | 4 |
| Number of VMs | 1 |
| Number of hosts PE | 6 |
| Number of VM PE | 1 |
| Number of Cloudlets | 32 |
| VM PES Capacity | 1000 |
| Cloudlet Length | 10000 |
| Cloudlet Scheduling Policy | Time Shared |
| VM Allocation Policy | Round Robin |
| Utilization model (Dynamic) | Full(100%) |
| VM Scheduling Policy | Time Shared |

**The result of Simulation 3:**

A picture containing computer

Description automatically generated

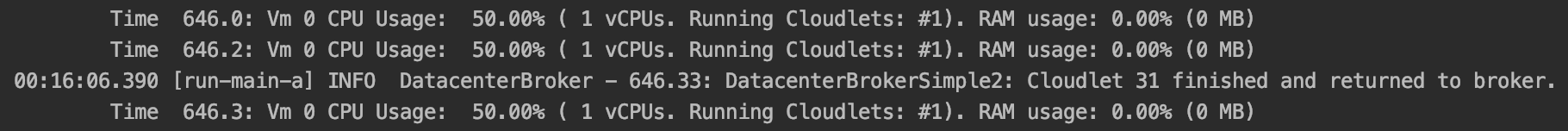
A screenshot of a computer

Description automatically generated

**Simulation 4:**

|  |  |
| --- | --- |
| Number of Datacenters | 1 |
| Number of Hosts | 4 |
| Number of VMs | 1 |
| Number of hosts PE | 6 |
| Number of VM PE | 1 |
| Number of Cloudlets | 32 |
| VM PES Capacity | 1000 |
| Cloudlet Length | 10000 |
| Cloudlet Scheduling Policy | Space Shared |
| VM Allocation Policy | Round Robin |
| Utilization model (Dynamic) | Half (50%) |
| VM Scheduling Policy | Time Shared |

**The result of Simulation 4:**



A screenshot of a computer

Description automatically generated

The simulations (3 and 4) show the effect of Cloudlet Scheduling policy and Utilization model on execution of cloudlets. In simulation 3, VM uses Time shared cloud scheduling policy, due to which the resources and PE are shared among the cloudlets. This increases the execution time of cloudlets since the cloudlets share the resource periodically. Whereas in simulation 4, the VM uses Space Shared Cloudlet Scheduling policy, this allows the cloudlet to complete the execution before the VM allocates the resources to the next Cloudlet. Thus, the order of execution is preserved in this case. Also, since only half the PE is utilized, the cloudlet takes 20 seconds to complete the execution rather than 10 seconds.

|  |  |
| --- | --- |
| Number of Datacenters | 1 |
| Number of Hosts | 4 |
| Number of VMs | 16 |
| Cost of Operation Per Sec | 3.0 |
| Cost Per Memory | 0.05 |
| Cost Per Storage: | 0.1 |
| Cost Per Bandwidth | 0.1 |
| VM Scheduling Policy | Time Shared |
| Cloudlet Scheduling Policy | Time Shared |
| Network Bandwidth | 10 |
| Network Latency | 10 |