**CIS 620 Spring 2019**

**Advance Operating System**

**Project # 4**



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**Ldshr.x**

This file contains the following:

* It has a struct max\_para which consists of 3 integers N(n), M(mean) , S(seed) which will be passed to FINDMAX\_GPU function as a parameter to find the largest element of an array which has 2N elements.
* It has a struct Node which stores the double value and pointer to the next Node. This is used basically to implement a linked list. This struct is passed as a parameter to function UPDATE\_LST.
* It declares three methods
  + GET\_LOAD : to calculate the load average of all the servers in past one minute and return the double value back to the client.
  + FINDMAX\_GPU: to find the largest element of an array and return the double value to the client.
  + UPDATE\_LST : to update the input linked list with the formula sqrt(F) \* 10 and return the updated linked list back.

**Machinefile**

This file consists the name of all the servers the client is going to contact for obtaining the load average and perform the methods on the least load average.

**ldshr.c**

This program does the following:

* It reads the machinefile and contacts all the hosts specified in the file one by one and gets their load average and stores it in array.
* Then it iterates the array and finds the least load average and chooses that client for future reference.
* Then based on the user input based on “-max” or “-upd” it performs further operations.
  + If user inputs “-max” then it calls findmax\_gpu\_1 with the parameters passed by the user and with the host having minimum load average. Then it displays the value returned by the method.
  + If user inputs “-upd” then it creates a linked list based on the parameters passed by the user. Once the LinkedList is created then it is passed as a parameter to update\_lst\_1 and prints the updated list returned by the server.



**Ldshr\_svc\_proc.c**

This program does the following:

* It has five methods get\_load\_1\_svc, findmax\_gpu\_1\_svc, update\_lst\_1\_svc , map, scorecard.
* Get\_load\_1\_svc : This method calculates the load average of the current machine and returns the value to the caller.
* Findmax\_gpu\_1\_svc : This method calls the reduceMax function defined in findmax.cu file based on the input parameters. Once the value is retruend by the reduceMax function it is returned to the caller.
* Updated\_lst\_1\_svc : This method takes linkedlist as a parameter and passes it to the function map. Once the map function returns the updated list it is returned to the user.
* Map: This function is a higher order function which takes a function address as input and the linkedlist. It then updates the values inside the list based on the formula applied in scorecard.
* Scorecard: This method simply takes the square root of the input parameter and multiplies it by 10 and returns the updated value.

**Findmax.cu**

This program calculates the largest element of an array and returns the value.

The array size is defined by the input parameter N. It also takes mean and seed value as input.

It then calls the reduce method of the GPU till it finds the largest element of the array and then returns it back to the caller.

Firstly it initialize the array according to these parameters such as N, Mean and Seed. The array is so huge because there are 220 numbers. Then copy the array to GPU, we defined 256(28) threads, so after first round we got 220/28=212 results. Then it call GPU again, 212 /28 = 24. Because 24 is 16, it is small, so we compare the 16 different result in CPU, Then get the max number.