Assignment No : 4.
Date : 14/02/2023

Code:

```
import java.io.*;
import java.util.*;
public class Berkley
{

float diff(int h, int m, int s, int nh, int nm, int ns){
int dh = h-nh;
int dm = m-nm;
int ds = s-ns;
int diff = (dh*60*60)+(dm*60)+ds;
return diff;
}

float average(float diff[], int n){
int sum=0;
for(int i=0; i<n; i++)
{
sum+=diff[i];
}
float average = (float)sum/(n+1);
System.out.println("The average of all time differences is "+average);
return average;
}

void sync(float diff[], int n, int h, int m, int s, int nh[], int nm[], int ns[], float average)
{
for(int i=0;i<n;i++)
{
diff[i]+=average;
int dh=(int)diff[i]/(60*60);
diff[i]%=(60*60);
int dm=(int)diff[i]/60;
diff[i]%=60;
int ds=(int)diff[i];

nh[i]+=dh;   //assign different hours value in “nh”  variable
if(nh[i]>23)
{
nh[i]%=24;
}

nm[i]+=dm;   //assign different minutes value in “nm”  variable
if(nm[i]>59)
{
nh[i]++;
nm[i]%=60;
}
```

```
ns[i]+=ds; //assign different second value in “ns”  variable
if(ns[i]>59)
{
nm[i]++;
ns[i]%=60;
}

if(ns[i]<0)
{
nm[i]--;
ns[i]+=60;
}
}
h+=(int)(average/(60*60));
if(h>23)
{ h%=24;
}
m+=(int)(average/(60*60*60));

if(m>59)
{
h++;
m%=60;
}
s+=(int)(average%(60*60*60));

if(s>59)
{
m++;s%=60;
}

if(s<0)
{
m--;
s+=60;
}


System.out.println("The synchronized clocks are:\nTime Server ---> "+h+" : "+m+" : "+s);
for(int i=0;i<n;i++)
{
System.out.println("Node "+(i+1)+" ---> "+nh[i]+" : "+nm[i]+" : "+ns[i]);
}
}
public static void main(String[] args) throws IOException {
Berkley b = new Berkley();
Date date = new Date();
BufferedReader obj = new BufferedReader(new InputStreamReader(System.in));
System.out.println("Enter number of nodes:");
int n = Integer.parseInt(obj.readLine()); int h = date.getHours();
int m = date.getMinutes();
int s = date.getSeconds();
```

```
int nh[] = new int[n];
int nm[] = new int[n];
int ns[] = new int[n];
for(int i=0; i<n; i++)
{
System.out.println("Enter time for node "+(i+1)+"\n Hours:");
nh[i]=Integer.parseInt(obj.readLine());
System.out.println("Minutes:");
nm[i]=Integer.parseInt(obj.readLine());
System.out.println("Seconds:");
ns[i]=Integer.parseInt(obj.readLine());
}
for(int i=0; i<n; i++)
{
System.out.println("Time Server sent time "+h+" : "+m+" : "+s+" to node "+(i+1));
}float diff[] = new float[n];
for(int i=0;i<n;i++)
{
diff[i] = b.diff(h,m,s,nh[i],nm[i],ns[i]);
System.out.println("Node "+(i+1)+" sent time difference of "+(int)diff[i]+" to Time Server.");
}
float average = b.average(diff,n);
b.sync(diff, n, h, m, s, nh, nm, ns, average);
}
}
```

SAVE FILE WITH NAME: **Berkley.java**

Output:

```
mmt-12@mmt12-OptiPlex-390:~$ javac Berkley.java
Note: Berkley.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.
mmt-12@mmt12-OptiPlex-390:~$ java Berkley
Enter number of nodes:
1
Enter time for node 1
 Hours:
2
Minutes:
15
Seconds:
30
Time Server sent time 11 : 59 : 59 to node 1
Node 1 sent time difference of 35069 to Time Server.
The average of all time differences is 17534.5
The synchronized clocks are:
Time Server ---> 15 : 60 : 13
Node 1 ---> 16 : 52 : 13
```