COMP 528 CA3

Laplace equation Inversion

Part 1

assg2.c

Finding Radiator temperature when the middle of room is 37 degree:

When N is 1024 and LIMIT is 100000

At temp 201.000000radtemp is 3.831119

At temp 202.000000radtemp is 15.447259

At temp 203.000000radtemp is 24.292422

At temp 204.000000radtemp is 30.019101

At temp 205.000000radtemp is 33.667241

At temp 206.000000radtemp is 36.004725

At temp 207.000000radtemp is 37.522379

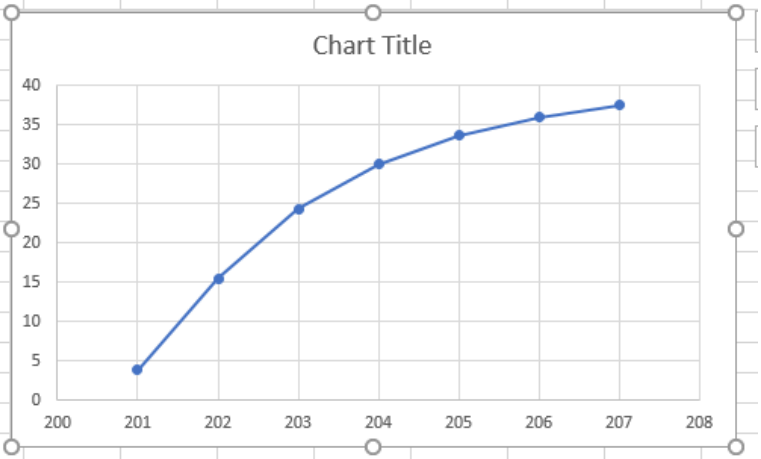
Radiator temperature of 207.000000 leads to target temperature at 512x512 of 37.522379

Computation took 82.378935 seconds

```
[sgrkuria@viz02[barkla] assign]$ icc -qopenmp assg2.c
[sgrkuria@viz02[barkla] assign]$ ./a.out
N of program     1024
 LIMIT of program        100000
Inputs are 200 0.500000 0.500000
radtemp is 3.815574
At temp 201.000000radtemp is 3.831119
At temp 202.000000radtemp is 15.447259
At temp 203.000000radtemp is 24.292422
At temp 204.000000radtemp is 30.019101
At temp 205.000000radtemp is 33.667241
At temp 206.000000radtemp is 36.004725
At temp 207.000000radtemp is 37.522379
Radiator temperature of 207.000000 leads to target temperature at 512x512 of 37.522379
Computation took 82.378935 seconds
```

N is 1024 and LIMIT is 100000

Iteration	Rad Temp	Center temp
1	201	3.831119
2	202	15.447259
3	203	24.292422
4	204	30.019101
5	205	33.667241
6	206	36.004725
7	207	37.522379



Part 2

assg2_1.c

run_mpi.sh

Bisection search to find the radiator temperature when the middle of room is 37 degree:

When N is 1024 and LIMIT is 100000,

range is 200.000000 - 400.000000 radtemp is 3.815574

range is 300.000000 - 400.000000 radtemp is 5.370073

range is 350.000000 - 400.000000 radtemp is 22.252226

Computation took 42.228674 seconds

At radtemp 375.000000 reached 37 degree

```
[sgrkuria@viz02[barkla] assign]$ icc -qopenmp assg2_1.c
[sgrkuria@viz02[barkla] assign]$ ./a.out
N of program     1024
 LIMIT of program        100000
Inputs are 400 0.500000 0.500000


range is 200.000000 - 400.000000  radtemp is 3.815574


range is 300.000000 - 400.000000  radtemp is 5.370073


range is 350.000000 - 400.000000  radtemp is 22.252226


Computation took 42.228674 seconds
at radtemp 375.000000 reached 37 degree
[sgrkuria@viz02[barkla] assign]$
```

N is 1024 and LIMIT is 100000

Iteration	Range	Mid value	Center temp
1	200.000000 - 400.000000	300	3.815574
2	300.000000 - 400.000000	350	5.370073
3	350.000000 - 400.000000	375	22.252226