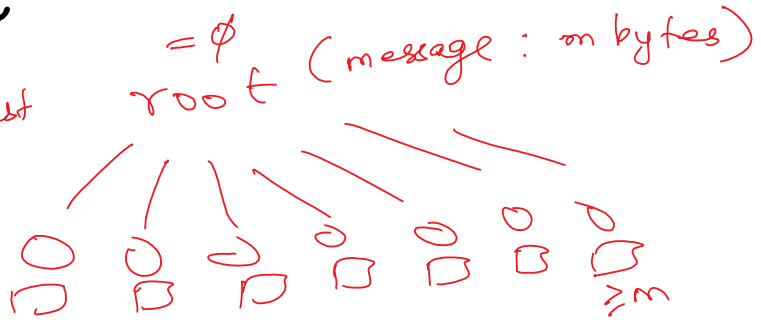
MPI: Collective Calls

Tuesday, September 18, 2018 11:47 AM

Collective Calls:

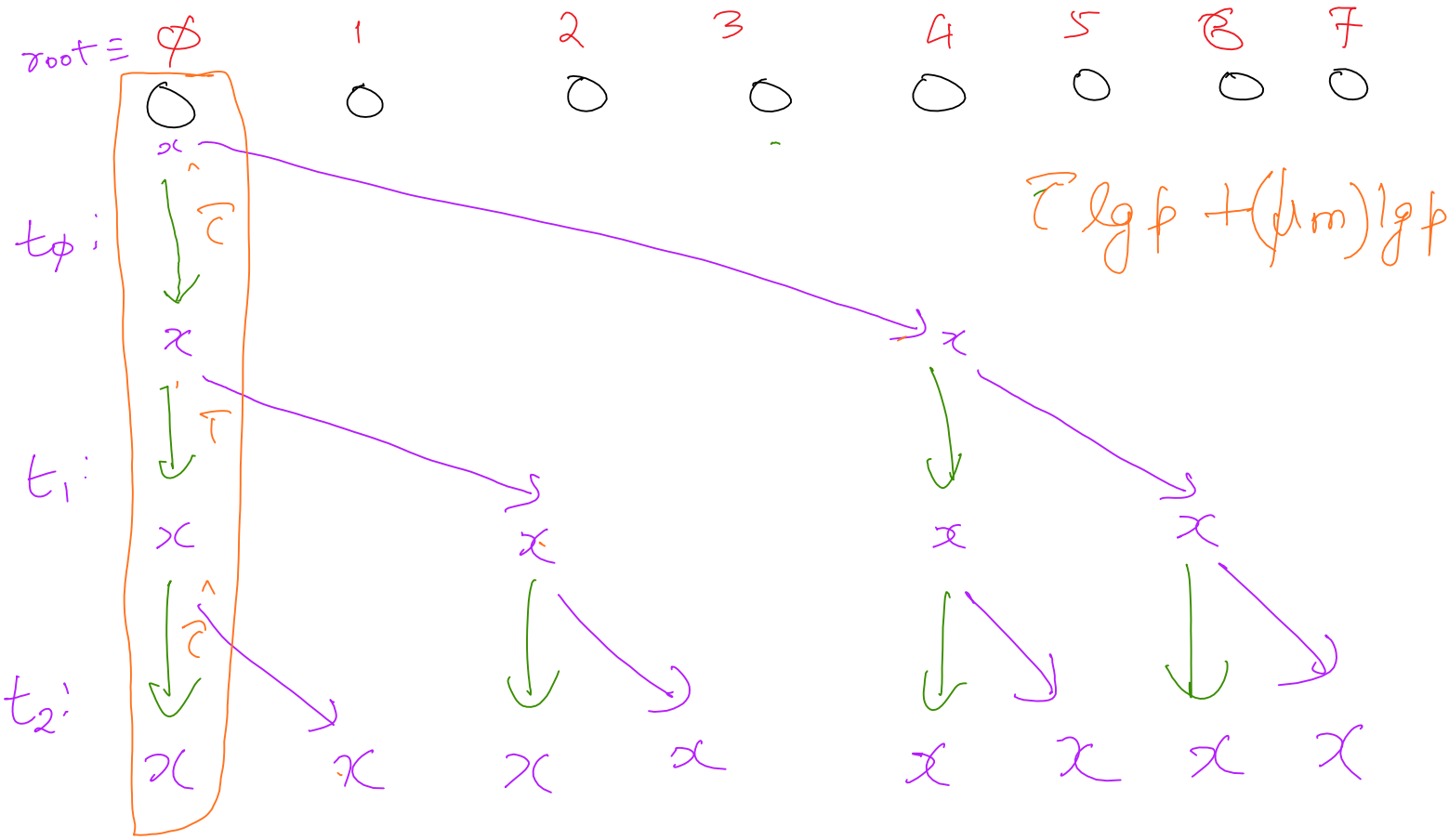
MPI_Bcast: broadcast



Brute force:

```
if (root)
    for (i: 1 to p-1)
        send(m) to i
else // not a root
    recv from ϕ
```

Alternative Approach:



#timesteps = $\lg p$

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Broadcast (analysis)

#timesteps = $\lg p$

At each time step:

cost = $\tau + \mu m$

$\Rightarrow$ Total time = $(\tau + \mu m) \lg p$

τ: latency

μ: inv. bandwidth

Comm. time

$= \tau + \mu m$

latency + transfer time

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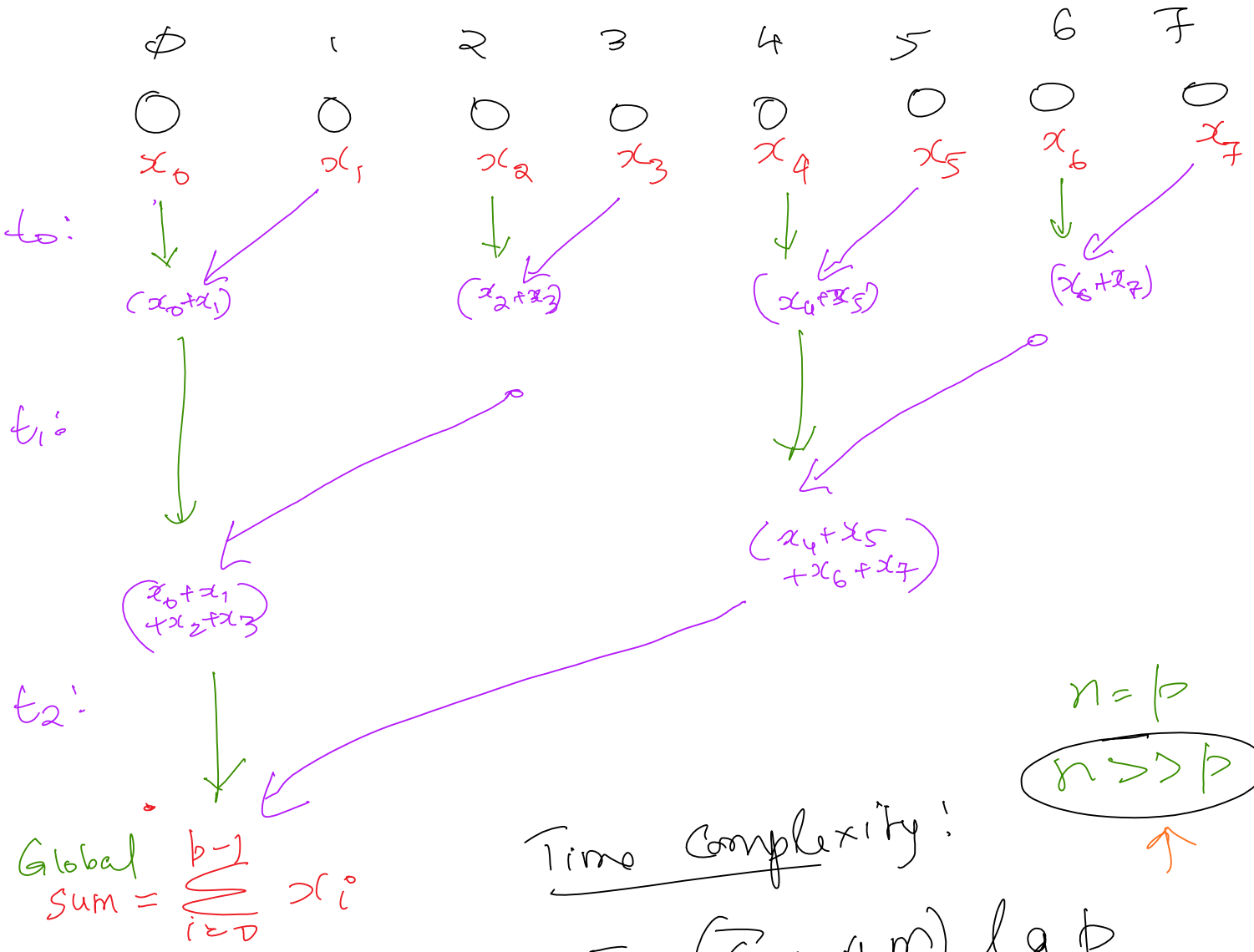
MPI Reduce:

Precondition: Proc i has 1 number

Postcondition: Proc ϕ has the sum



$n = p$

$n >> p$?

Time Complexity:

$= (C + \mu m) \lg p$

Property of operator:

1) binary operator $a \oplus b$

2) Associative: $(a \oplus b) \oplus c = a \oplus (b \oplus c)$

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