POLITECNICO
MILANO 1863

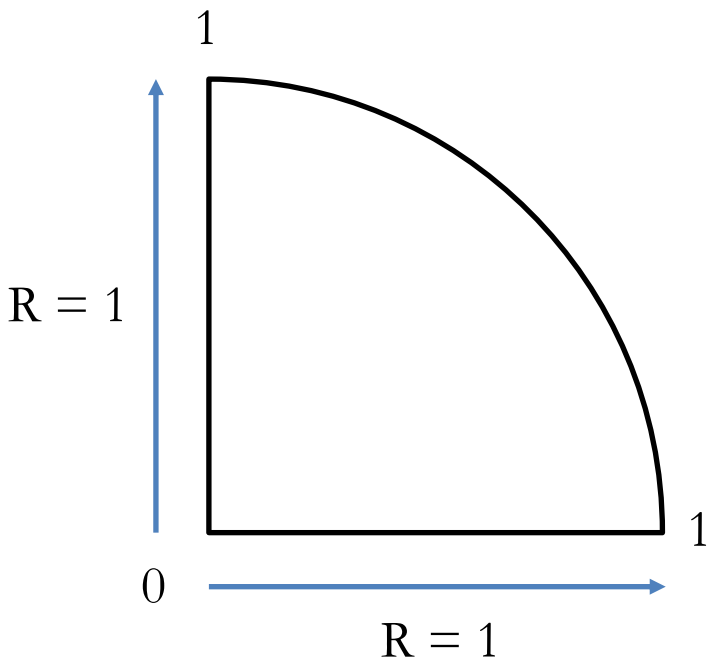
MPI

Alessandro Margara
alessandro.margara@polimi.it
https://margara.faculty.polimi.it

Exercise 1

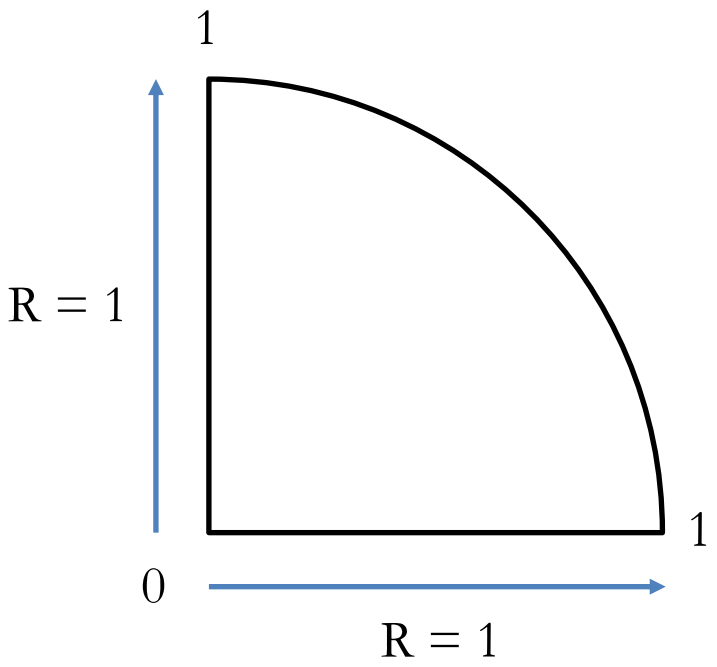
- Use a Monte Carlo simulation to estimate the value of Pi

- Given a circle of radius R=1, its area is A=Pi
  - Let us consider only one forth of the circle
  - Then the area is A=Pi/4



Exercise 1

- Consider the cartesian coordinates as in figure
- Given a point P(x,y) it will be within the circle iff
  - Sqrt(x^2+y^2) <= Sqrt(1)
  - x^2+y^2 <= 1
- We can estimate A by generating many random points and checking how many of them fall within the circle
- We can then compute Pi = 4*A



Exercise 2

- Implement a guess game
  - N rounds
  - One process acts as leader and selects a number X between 1 and 1000 (included)
    - In the first round, the leader is process 0
  - All processes (including the leader) select a random number and send it to the leader
    - The process that selects the number that is closest to X wins the round and becomes the leader for the next round
    - If multiple processes have the same score, no one wins the round, and the leader does not change
  - Process 0 keeps track of the number of rounds won by each process and prints the updated leaderboard at the end of each round