

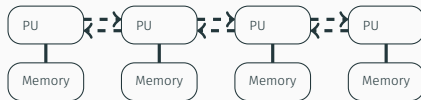
# Introduction to MPI

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Jeremy Iverson

College of Saint Benedict & Saint John's University

# background



- A standard for explicit distributed memory parallel computation.
- Many implementations available, both open-source and proprietary.

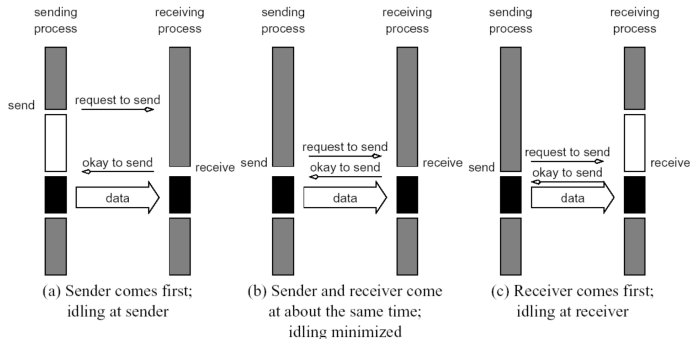
# execution model

- Uses the *SPMD* model of parallelism
  - All processes execute the same program.
    - Different processes carry out different actions by conditional execution of code based on processes' rank.
    - Processes can communicate with each other by sending explicit messages

- Requires inclusion of `mpi.h` header file.
- `MPI_Init()`
- `MPI_Finalize()`
- `MPI_Comm_size()`
- `MPI_Comm_rank()`
- `MPI_Send()`
- `MPI_Recv()`

# point-to-point communication

- MPI uses *communicators* to organize processes. Processes can only communicate with other processes in the same communicator. The base communicator to which all processes belong is called **MPI\_COMM\_WORLD**.
- Programs can deadlock due to improperly ordered or unmatched point-to-point communications.





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