
Language Study: Erlang



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A Distributed Adventure Game in Erlang

Clients, Server, and Locations

5 Erlang shells so far:

- 1 server (to rule them all): Rosanna
- 2 clients: Jenny and Layla
- 2 locations: Pamela (loc1) and Betty (loc2)

A Distributed Adventure Game in Erlang

Compile



The image displays five separate Erlang shell windows, each with a blue background and a white title bar. The windows are arranged in a grid-like fashion. Each window shows the execution of a compile command and its successful output.

- Pamela (beam.smp) 33**:
`(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}`
- Betty (beam.smp) 36**:
`(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}`
- Jenny (beam.smp) 34**:
`(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}`
- Rosanna (beam.smp) 31**:
`(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}`
- Layla (beam.smp) 35**:
`(layla@Alans-2021-iMac)5> c(gameClient).
{ok,gameClient}`

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Start server and clients

```
(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}
```

```
(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}
```

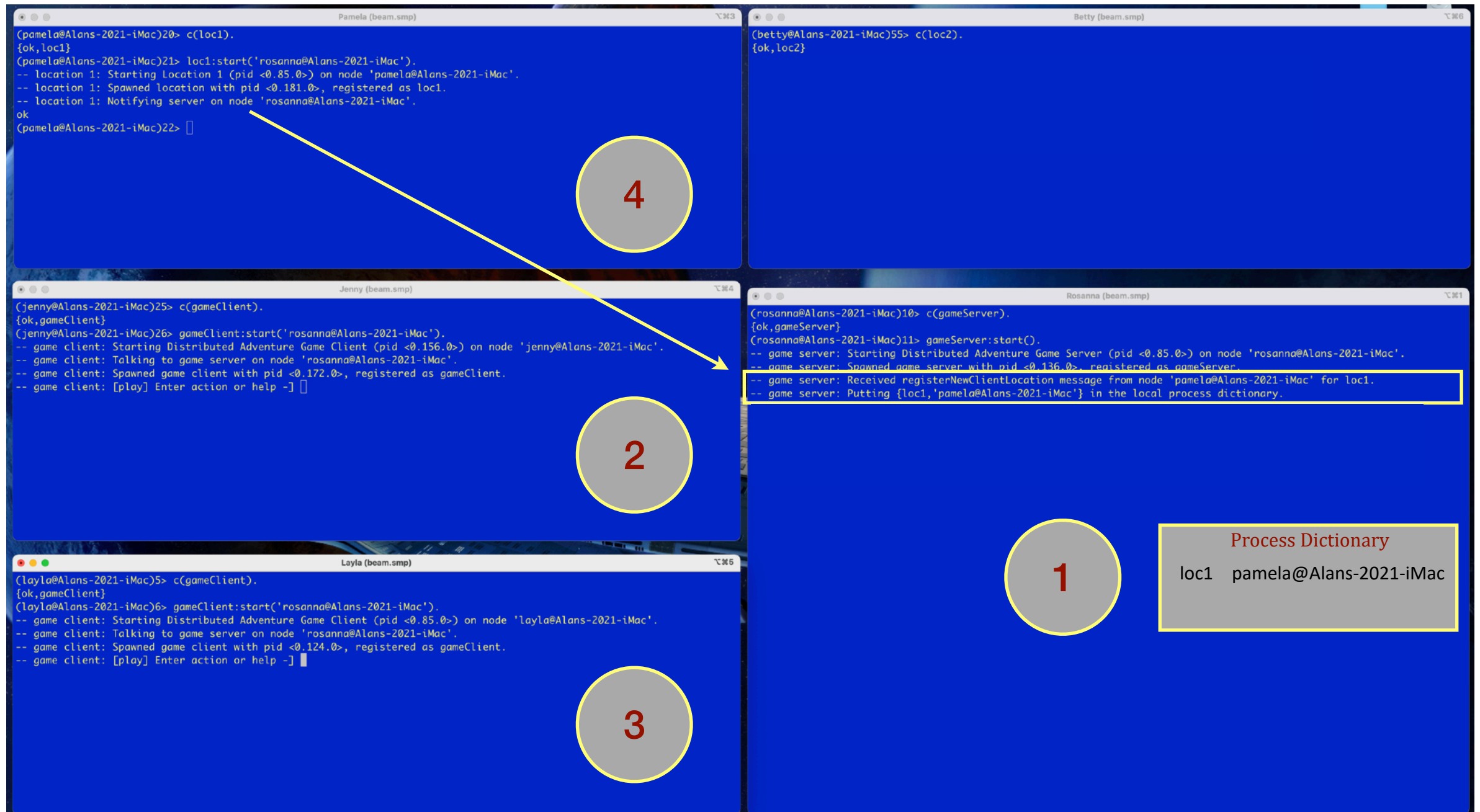
```
(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}
(jenny@Alans-2021-iMac)26> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.156.0>) on node 'jenny@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.172.0>, registered as gameClient.
-- game client: [play] Enter action or help -> []
```

```
(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}
(rosanna@Alans-2021-iMac)11> gameServer:start().
-- game server: Starting Distributed Adventure Game Server (pid <0.85.0>) on node 'rosanna@Alans-2021-iMac'.
-- game server: Spawned game server with pid <0.136.0>, registered as gameServer.
```

```
(layla@Alans-2021-iMac)5> c(gameClient).
{ok,gameClient}
(layla@Alans-2021-iMac)6> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.85.0>) on node 'layla@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.124.0>, registered as gameClient.
-- game client: [play] Enter action or help -> []
```

A Distributed Adventure Game in Erlang

Start location 1



A Distributed Adventure Game in Erlang

Start location 2

The screenshot displays five Erlang shell windows, each representing a different node in the distributed system. The windows are labeled with numbers 1 through 5 in yellow circles:

- Window 1 (Rosanna):** Shows the initialization of the game server. It starts the `gameServer` process and registers the locations `loc1` and `loc2` in the local process dictionary.
- Window 2 (Jenny):** Shows the initialization of a game client. It starts the `gameClient` process and registers it in the local process dictionary.
- Window 3 (Layla):** Shows the initialization of a game client. It starts the `gameClient` process and registers it in the local process dictionary.
- Window 4 (Pamela):** Shows the initialization of a location. It starts the `loc1` process and registers it in the local process dictionary.
- Window 5 (Betty):** Shows the initialization of a location. It starts the `loc2` process and registers it in the local process dictionary.

A yellow arrow points from the `loc2` entry in the Process Dictionary to the `loc2` entry in the Rosanna shell window, indicating the registration of the location.

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

A Distributed Adventure Game in Erlang

Ready to play

```
(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}
(pamela@Alans-2021-iMac)21> loc1:start('rosanna@Alans-2021-iMac').
-- location 1: Starting Location 1 (pid <0.85.0>) on node 'pamela@Alans-2021-iMac'.
-- location 1: Spawned location with pid <0.181.0>, registered as loc1.
-- location 1: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
(pamela@Alans-2021-iMac)22> []

(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}
(betty@Alans-2021-iMac)56> loc2:start('rosanna@Alans-2021-iMac').
-- location 2: Starting Location 2 (pid <0.195.0>) on node 'betty@Alans-2021-iMac'.
-- location 2: Spawned location with pid <0.244.0>, registered as loc2.
-- location 2: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
(betty@Alans-2021-iMac)57> []

(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}
(jenny@Alans-2021-iMac)26> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.156.0>) on node 'jenny@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.172.0>, registered as gameClient.
-- game client: [play] Enter action or help -> []

(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}
(rosanna@Alans-2021-iMac)11> gameServer:start().
-- game server: Starting Distributed Adventure Game Server (pid <0.85.0>) on node 'rosanna@Alans-2021-iMac'.
-- game server: Spawned game server with pid <0.136.0>, registered as gameServer.
-- game server: Received registerNewClientLocation message from node 'pamela@Alans-2021-iMac' for loc1.
-- game server: Putting {loc1,'pamela@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received registerNewClientLocation message from node 'betty@Alans-2021-iMac' for loc2.
-- game server: Putting {loc2,'betty@Alans-2021-iMac'} in the local process dictionary.
-- game server: [admin] Enter command or help -> []

(layla@Alans-2021-iMac)5> c(gameClient).
{ok,gameClient}
(layla@Alans-2021-iMac)6> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.85.0>) on node 'layla@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.124.0>, registered as gameClient.
-- game client: [play] Enter action or help -> []
```

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

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Game Client on Jenny: go home

The screenshot displays four Erlang shell windows, each representing a different node in a distributed system:

- Pamela (beam.smp):** Shows the initialization of location 1. The user enters `c(loc1).`, and the system starts location 1 on node 'pamela@Alans-2021-iMac'.
- Betty (beam.smp):** Shows the initialization of location 2. The user enters `c(loc2).`, and the system starts location 2 on node 'betty@Alans-2021-iMac'.
- Jenny (beam.smp):** Shows the execution of the game client. The user enters `c(gameClient).` and `gameClient:start('rosanna@Alans-2021-iMac').`. The client then enters `[play] Enter action or help -] go home`. The system responds with `[debug] Going to location [home].` and then an error message: `Received message ["You cannot go that way."] from node 'rosanna@Alans-2021-iMac'.`
- Rosanna (beam.smp):** Shows the execution of the game server. The user enters `c(gameServer).` and `gameServer:start().`. The server then receives a `goToClientLocation` message from node 'jenny@Alans-2021-iMac' for location [home]. The server responds with `Node not found in the local process dictionary.`

Yellow arrows indicate the flow of information: one arrow points from the error message in Jenny's window to the 'Process Dictionary' box, and another arrow points from the 'Process Dictionary' box back to Jenny's window.

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

A Distributed Adventure Game in Erlang

Game Client on Jenny: go loc1

```
(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}
(pamela@Alans-2021-iMac)21> loc1:start('rosanna@Alans-2021-iMac').
-- location 1: Starting Location 1 (pid <0.85.0>) on node 'pamela@Alans-2021-iMac'.
-- location 1: Spawned location with pid <0.181.0>, registered as loc1.
-- location 1: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
-- location 1: A gameClient on 'jenny@Alans-2021-iMac' is entering loc1.
(pamela@Alans-2021-iMac)22> []

(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}
(betty@Alans-2021-iMac)56> loc2:start('rosanna@Alans-2021-iMac').
-- location 2: Starting Location 2 (pid <0.195.0>) on node 'betty@Alans-2021-iMac'.
-- location 2: Spawned location with pid <0.244.0>, registered as loc2.
-- location 2: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
(betty@Alans-2021-iMac)57> []

(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}
(jenny@Alans-2021-iMac)26> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.156.0>) on node 'jenny@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.172.0>, registered as gameClient.
-- game client: [play] Enter action or help ->] go home
-- game client: [debug] Going to location [home].
-- game client: ok
-- game client: Received message ["You cannot go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: [play] Enter action or help ->] go loc1
-- game client: [debug] Going to location [loc1].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(1) You are standing inside of a small but tall elevator."] from node 'pamela@Alans-2021-iMac'.
-- game client: [play] Enter action or help ->] []

(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}
(rosanna@Alans-2021-iMac)11> gameServer:start().
-- game server: Starting Distributed Adventure Game Server (pid <0.85.0>) on node 'rosanna@Alans-2021-iMac'.
-- game server: Spawned game server with pid <0.136.0>, registered as gameServer.
-- game server: Received registerNewClientLocation message from node 'pamela@Alans-2021-iMac' for loc1.
-- game server: Putting {loc1,'pamela@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received registerNewClientLocation message from node 'betty@Alans-2021-iMac' for loc2.
-- game server: Putting {loc2,'betty@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [home].
-- game server: Getting node for location [home] from the local process dictionary.
-- game server: Node not found in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [loc1].
-- game server: Getting node for location [loc1] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['pamela@Alans-2021-iMac'].
-- game server: [admin] Enter command or help ->] []

(Layla@Alans-2021-iMac)5> c(gameClient).
{ok,gameClient}
(Layla@Alans-2021-iMac)6> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.85.0>) on node 'layla@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.124.0>, registered as gameClient.
-- game client: [play] Enter action or help ->] []
```

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

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Game Client on Layla: go loc1

```
(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}
(pamela@Alans-2021-iMac)21> loc1:start('rosanna@Alans-2021-iMac').
-- location 1: Starting Location 1 (pid <0.85.0>) on node 'pamela@Alans-2021-iMac'.
-- location 1: Spawned location with pid <0.181.0>, registered as loc1.
-- location 1: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
-- location 1: A gameClient on 'jenny@Alans-2021-iMac' is entering loc1.
-- location 1: A gameClient on 'layla@Alans-2021-iMac' is entering loc1.
(pamela@Alans-2021-iMac)22> []

(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}
(betty@Alans-2021-iMac)56> loc2:start('rosanna@Alans-2021-iMac').
-- location 2: Starting Location 2 (pid <0.195.0>) on node 'betty@Alans-2021-iMac'.
-- location 2: Spawned location with pid <0.244.0>, registered as loc2.
-- location 2: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
(betty@Alans-2021-iMac)57> []

(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}
(jenny@Alans-2021-iMac)26> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.156.0>) on node 'jenny@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.172.0>, registered as gameClient.
-- game client: [play] Enter action or help -> go home
-- game client: [debug] Going to location [home].
-- game client: ok
-- game client: Received message ["You cannot go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> go loc1
-- game client: [debug] Going to location [loc1].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(1) You are standing inside of a small but tall elevator."] from node 'pamela@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> []

(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}
(rosanna@Alans-2021-iMac)11> gameServer:start().
-- game server: Starting Distributed Adventure Game Server (pid <0.85.0>) on node 'rosanna@Alans-2021-iMac'.
-- game server: Spawned game server with pid <0.136.0>, registered as gameServer.
-- game server: Received registerNewClientLocation message from node 'pamela@Alans-2021-iMac' for loc1.
-- game server: Putting {loc1,'pamela@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received registerNewClientLocation message from node 'betty@Alans-2021-iMac' for loc2.
-- game server: Putting {loc2,'betty@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [home].
-- game server: Getting node for location [home] from the local process dictionary.
-- game server: Node not found in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [loc1].
-- game server: Getting node for location [loc1] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['pamela@Alans-2021-iMac'].
-- game server: Received goToClientLocation message from node 'layla@Alans-2021-iMac' for location [loc1].
-- game server: Getting node for location [loc1] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['pamela@Alans-2021-iMac'].
-- game server: [admin] Enter command or help -> []

(layla@Alans-2021-iMac)6> c(gameClient).
{ok,gameClient}
(layla@Alans-2021-iMac)6> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.85.0>) on node 'layla@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.124.0>, registered as gameClient.
-- game client: [play] Enter action or help -> go loc1
-- game client: [debug] Going to location [loc1].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(1) You are standing inside of a small but tall elevator."] from node 'pamela@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> []
```

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

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Game Client on Layla: go loc2

```
(pamela@Alans-2021-iMac)20> c(loc1).
{ok,loc1}
(pamela@Alans-2021-iMac)21> loc1:start('rosanna@Alans-2021-iMac').
-- location 1: Starting Location 1 (pid <0.85.0>) on node 'pamela@Alans-2021-iMac'.
-- location 1: Spawned location with pid <0.181.0>, registered as loc1.
-- location 1: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
-- location 1: A gameClient on 'jenny@Alans-2021-iMac' is entering loc1.
-- location 1: A gameClient on 'layla@Alans-2021-iMac' is entering loc1.
(pamela@Alans-2021-iMac)22> []

(betty@Alans-2021-iMac)55> c(loc2).
{ok,loc2}
(betty@Alans-2021-iMac)56> loc2:start('rosanna@Alans-2021-iMac').
-- location 2: Starting Location 2 (pid <0.195.0>) on node 'betty@Alans-2021-iMac'.
-- location 2: Spawned location with pid <0.244.0>, registered as loc2.
-- location 2: Notifying server on node 'rosanna@Alans-2021-iMac'.
ok
-- location 2: A gameClient on 'layla@Alans-2021-iMac' is entering loc2.
(betty@Alans-2021-iMac)57> []

(jenny@Alans-2021-iMac)25> c(gameClient).
{ok,gameClient}
(jenny@Alans-2021-iMac)26> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.156.0>) on node 'jenny@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.172.0>, registered as gameClient.
-- game client: [play] Enter action or help -> go home
-- game client: [debug] Going to location [home].
-- game client: ok
-- game client: Received message ["You cannot go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> go loc1
-- game client: [debug] Going to location [loc1].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(1) You are standing inside of a small but tall elevator."] from node 'pamela@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> []

(rosanna@Alans-2021-iMac)10> c(gameServer).
{ok,gameServer}
(rosanna@Alans-2021-iMac)11> gameServer:start().
-- game server: Starting Distributed Adventure Game Server (pid <0.85.0>) on node 'rosanna@Alans-2021-iMac'.
-- game server: Spawned game server with pid <0.136.0>, registered as gameServer.
-- game server: Received registerNewClientLocation message from node 'pamela@Alans-2021-iMac' for loc1.
-- game server: Putting {loc1,'pamela@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received registerNewClientLocation message from node 'betty@Alans-2021-iMac' for loc2.
-- game server: Putting {loc2,'betty@Alans-2021-iMac'} in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [home].
-- game server: Getting node for location [home] from the local process dictionary.
-- game server: Node not found in the local process dictionary.
-- game server: Received goToClientLocation message from node 'jenny@Alans-2021-iMac' for location [loc1].
-- game server: Getting node for location [loc1] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['pamela@Alans-2021-iMac'].
-- game server: Received goToClientLocation message from node 'layla@Alans-2021-iMac' for location [loc1].
-- game server: Getting node for location [loc1] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['pamela@Alans-2021-iMac'].
-- game server: Received goToClientLocation message from node 'layla@Alans-2021-iMac' for location [loc2].
-- game server: Getting node for location [loc2] from the local process dictionary.
-- game server: Found node in the local process dictionary: ['betty@Alans-2021-iMac'].
-- game server: [admin] Enter command or help -> []

(Layla@Alans-2021-iMac)6> gameClient:start('rosanna@Alans-2021-iMac').
-- game client: Starting Distributed Adventure Game Client (pid <0.85.0>) on node 'layla@Alans-2021-iMac'.
-- game client: Talking to game server on node 'rosanna@Alans-2021-iMac'.
-- game client: Spawned game client with pid <0.124.0>, registered as gameClient.
-- game client: [play] Enter action or help -> go loc1
-- game client: [debug] Going to location [loc1].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(1) You are standing inside of a small but tall elevator."] from node 'pamela@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> go loc2
-- game client: [debug] Going to location [loc2].
-- game client: ok
-- game client: Received message ["[debug] You CAN go that way."] from node 'rosanna@Alans-2021-iMac'.
-- game client: Received message ["(2) You find yourself enmeshed in the long, dark, tea-time of the soul.\n"] from node 'betty@Alans-2021-iMac'.
-- game client: [play] Enter action or help -> []
```

Process Dictionary

loc1	pamela@Alans-2021-iMac
loc2	betty@Alans-2021-iMac

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code: Game Server

code: Game Client

code: Location 1

code: Location 2