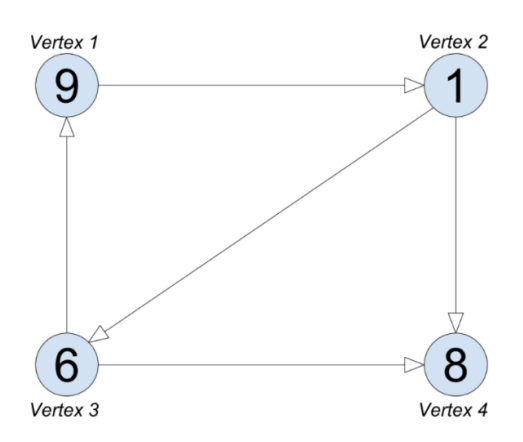
## Exercise 1: Getting familiar with GraphX’s Pregel API

For the given graph:

The next supersteps will occur:

1. First superstep:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Vertex id | Initial state | Messages received | Result of calculations (merge) | Resulting state (apply) | Message sent (sendMsg) | Destination nodes (sendMsg) |
| 1 | 9 | Integer.MAX\_VALUE | Integer.MAX\_VALUE | 9 | 9 | 2 |
| 2 | 1 | Integer.MAX\_VALUE | Integer.MAX\_VALUE | 1 | - | - |
| 3 | 6 | Integer.MAX\_VALUE | Integer.MAX\_VALUE | 6 | - | - |
| 4 | 8 | Integer.MAX\_VALUE | Integer.MAX\_VALUE | 8 | - | - |

1. Second superstep:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Vertex id | Initial state | Messages received | Result of calculations (merge) | Resulting state (apply) | Message sent (sendMsg) | Destination nodes (sendMsg) |
| 1 | 9 | - | - | 9 | - | - |
| 2 | 1 | 9 | 9 | 9 | 9 | 3, 4 |
| 3 | 6 | - | 6 | 6 | - | - |
| 4 | 8 | - | 8 | 8 | - | - |

1. Third superstep:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Vertex id | Initial state | Messages received | Result of calculations (merge) | Resulting state (apply) | Message sent (sendMsg) | Destination nodes (sendMsg) |
| 1 | 9 | - | 9 | 9 | - | - |
| 2 | 9 | - | 9 | 9 | - | - |
| 3 | 6 | 9 | 9 | 9 | - | - |
| 4 | 8 | 9 | 9 | 9 | - | - |

After the third superstep, no messages are sent, so no vertex becomes active. Therefore, the algorithm stops with a max value of 9.