

Raport Systemy Rozproszone
Lab 4 Akka
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Zadanie 1

Po implementacji `MathActorDivide` i zakomentowaniu zbędnych `printów`:

Testy dla sekwencji operacji:

```
system.tell(new MathActor.MathCommandMultiply(5, 3, null));
system.tell(new MathActor.MathCommandMultiply(5, 2, null));
system.tell(new MathActor.MathCommandDivide(15, 3, null));
system.tell(new MathActor.MathCommandDivide(15, 5, null));
system.tell(new MathActor.MathCommandDivide(15, 0, null));
Thread.sleep(2000);
system.tell(new MathActor.MathCommandMultiply(5, 3, null));
system.tell(new MathActor.MathCommandMultiply(5, 2, null));
system.tell(new MathActor.MathCommandDivide(15, 3, null));
system.tell(new MathActor.MathCommandDivide(15, 5, null));
```

Strategia Domyślna Stop:

```
C:\Users\radek\jdk\openjdk-10\bin\java.exe ...
Z1 main: started
[actorMath-akka.actor.default-dispatcher-5] INFO akka.event.slf4j.Slf4jLogger - Slf4jLogger started
Z1 main: actor system ready
ActorDivide: I made 1 operations
actorMultiply: I made 1 operations
ActorDivide: I made 2 operations
actorMultiply: I made 2 operations
[actorMath-akka.actor.default-dispatcher-6] ERROR akka.actor.SupervisorStrategy - / by zero
java.lang.ArithmeticException: Create breakpoint: / by zero
    at Z1.MathActorDivide.onMathCommandDivide(MathActorDivide.java:31)
    at akka.actor.typed.javadsl.BuiltReceive.receive(ReceiveBuilder.scala:213)
    at akka.actor.typed.javadsl.BuiltReceive.receiveMessage(ReceiveBuilder.scala:204)
    at akka.actor.typed.javadsl.Receive.receive(Receive.scala:53)
    at akka.actor.typed.javadsl.AbstractBehavior.receive(AbstractBehavior.scala:64)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.adapter.ActorAdapter.handleMessage(ActorAdapter.scala:131)
    at akka.actor.typed.internal.adapter.ActorAdapter.aroundReceive(ActorAdapter.scala:107)
    at akka.actor.ActorCell.receiveMessage(ActorCell.scala:579)
    at akka.actor.ActorCell.invoke(ActorCell.scala:547)
    at akka.dispatch.Mailbox.processMailbox(Mailbox.scala:270)
    at akka.dispatch.Mailbox.run(Mailbox.scala:231)
    at akka.dispatch.Mailbox.exec(Mailbox.scala:243) <5 internal calls>
Z1 main: sending second package of messages
Z1 main: messages send
actorMultiply: I made 3 operations
actorMultiply: I made 4 operations
[actorMath-akka.actor.default-dispatcher-6] INFO akka.actor.LocalActorRef - Message [Z1.MathActor$MathCommandDivide] to Actor[akka://actorMath/user/actorDivide#351822949] was not
[actorMath-akka.actor.default-dispatcher-6] INFO akka.actor.LocalActorRef - Message [Z1.MathActor$MathCommandDivide] to Actor[akka://actorMath/user/actorDivide#351822949] was not
```

Możemy zauważyć, że aktor `divide` zatrzymał się i już nie przetwarza wiadomości. Aktor `Multiply` działa dalej.

Strategia Resume:

```
C:\Users\radek\.jdk\openjdk-16\bin\java.exe ...
Z1 main: started
[actorMath-akka.actor.default-dispatcher-5] INFO akka.event.slf4j.Slf4jLogger - Slf4jLogger started
Z1 main: actor system ready
actorMultiply: I made 1 operations
ActorDivide: I made 1 operations
actorMultiply: I made 2 operations
ActorDivide: I made 2 operations
[actorMath-akka.actor.default-dispatcher-3] ERROR akka.actor.typed.Behavior$ - Supervisor ResumeSupervisor saw failure: / by zero
java.lang.ArithmeticException: Create breakpoint : / by zero
    at Z1.MathActorDivide.onMathCommandDivide(MathActorDivide.java:31)
    at akka.actor.typed.javadsl.BuiltReceive.receive(ReceiveBuilder.scala:213)
    at akka.actor.typed.javadsl.BuiltReceive.receiveMessage(ReceiveBuilder.scala:204)
    at akka.actor.typed.javadsl.Receive.receive(Receive.scala:53)
    at akka.actor.typed.javadsl.AbstractBehavior.receive(AbstractBehavior.scala:64)
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.InterceptorImpl$$anon$2.apply(InterceptorImpl.scala:57)
    at akka.actor.typed.internal.SimpleSupervisor.aroundReceive(Supervision.scala:124)
    at akka.actor.typed.internal.InterceptorImpl.receive(InterceptorImpl.scala:85)
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.adapter.ActorAdapter.handleMessage(ActorAdapter.scala:131)
    at akka.actor.typed.internal.adapter.ActorAdapter.aroundReceive(ActorAdapter.scala:107)
    at akka.actor.ActorCell.receiveMessage(ActorCell.scala:579)
    at akka.actor.ActorCell.invoke(ActorCell.scala:547)
    at akka.dispatch.Mailbox.processMailbox(Mailbox.scala:270)
    at akka.dispatch.Mailbox.run(Mailbox.scala:231)
    at akka.dispatch.Mailbox.exec(Mailbox.scala:243) <5 internal calls>
Z1 main: sending second package of messages
Z1 main: messages send
```

```
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.adapter.ActorAdapter.handleMessage(ActorAdapter.scala:131)
    at akka.actor.typed.internal.adapter.ActorAdapter.aroundReceive(ActorAdapter.scala:107)
    at akka.actor.ActorCell.receiveMessage(ActorCell.scala:579)
    at akka.actor.ActorCell.invoke(ActorCell.scala:547)
    at akka.dispatch.Mailbox.processMailbox(Mailbox.scala:270)
    at akka.dispatch.Mailbox.run(Mailbox.scala:231)
    at akka.dispatch.Mailbox.exec(Mailbox.scala:243) <5 internal calls>
Z1 main: sending second package of messages
Z1 main: messages send
actorMultiply: I made 3 operations
actorMultiply: I made 4 operations
ActorDivide: I made 3 operations
ActorDivide: I made 4 operations
|
```

Aktor Multiply działał dobrze, niezależnie od aktora Divide. Aktor Divide po nieudanej operacji wznowił działanie, jego licznik się nie zmienił i policzył tylko udane operacje.

Strategia Restart:

```
C:\Users\radek\.jdk\openjdk-16\bin\java.exe ...
Z1 main: started
[actorMath-akka.actor.default-dispatcher-5] INFO akka.event.slf4j.Slf4jLogger - Slf4jLogger started
Z1 main: actor system ready
ActorDivide: I made 1 operations
ActorDivide: I made 2 operations
actorMultiply: I made 1 operations
actorMultiply: I made 2 operations
[actorMath-akka.actor.default-dispatcher-5] ERROR akka.actor.typed.Behavior$ - Supervisor RestartSupervisor saw failure: / by zero
java.lang.ArithmeticException: Create breakpoint : / by zero
    at Z1.MathActorDivide.onMathCommandDivide(MathActorDivide.java:31)
    at akka.actor.typed.javadsl.BuiltReceive.receive(ReceiveBuilder.scala:213)
    at akka.actor.typed.javadsl.BuiltReceive.receiveMessage(ReceiveBuilder.scala:204)
    at akka.actor.typed.javadsl.Receive.receive(Receive.scala:53)
    at akka.actor.typed.javadsl.AbstractBehavior.receive(AbstractBehavior.scala:64)
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.InterceptorImpl$$anon$2.apply(InterceptorImpl.scala:57)
    at akka.actor.typed.internal.RestartSupervisor.aroundReceive(Supervision.scala:268)
    at akka.actor.typed.internal.InterceptorImpl.receive(InterceptorImpl.scala:85)
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.adapter.ActorAdapter.handleMessage(ActorAdapter.scala:131)
    at akka.actor.typed.internal.adapter.ActorAdapter.aroundReceive(ActorAdapter.scala:107)
    at akka.actor.ActorCell.receiveMessage(ActorCell.scala:579)
    at akka.actor.ActorCell.invoke(ActorCell.scala:547)
    at akka.dispatch.Mailbox.processMailbox(Mailbox.scala:270)
    at akka.dispatch.Mailbox.run(Mailbox.scala:231)
    at akka.dispatch.Mailbox.exec(Mailbox.scala:243) <5 internal calls>
Z1 main: sending second package of messages
Z1 main: messages send
actorMultiply: I made 3 operations
```

```
    at akka.actor.typed.Behavior$.interpret(Behavior.scala:274)
    at akka.actor.typed.Behavior$.interpretMessage(Behavior.scala:230)
    at akka.actor.typed.internal.adapter.ActorAdapter.handleMessage(ActorAdapter.scala:131)
    at akka.actor.typed.internal.adapter.ActorAdapter.aroundReceive(ActorAdapter.scala:107)
    at akka.actor.ActorCell.receiveMessage(ActorCell.scala:579)
    at akka.actor.ActorCell.invoke(ActorCell.scala:547)
    at akka.dispatch.Mailbox.processMailbox(Mailbox.scala:270)
    at akka.dispatch.Mailbox.run(Mailbox.scala:231)
    at akka.dispatch.Mailbox.exec(Mailbox.scala:243) <5 internal calls>
Z1 main: sending second package of messages
Z1 main: messages send
actorMultiply: I made 3 operations
actorMultiply: I made 4 operations
ActorDivide: I made 1 operations
ActorDivide: I made 2 operations
|
```

Aktor Multiply działał dobrze, niezależnie od aktora Divide. Aktor Divide po nieudanej operacji wznowił działanie, ale jego licznik operacji wyzerował się.

Wnioski:

- Strategia STOP - zatrzymuje aktora uniemożliwiając dalsze przetwarzanie wiadomości.
- Strategia RESUME- po prostu ignoruje błąd, nie zmienia stanu aktora.

- Strategia RESTART - restartuje aktora, inicjalizuje jego stan na nowo.

Zadanie 2

a)

Po zmodyfikowaniu ActorTextService:

```

Z2_Main x
C:\Users\radek\.jdk\openjdk-16\bin\java.exe ...
akka://z2main/user/upper1 registered
akka://z2main/user/upper2 registered
creating receive for text service
request: hello
sending to worker: Actor[akka://z2main/user/upper1#-910241872]
sending to worker: Actor[akka://z2main/user/upper2#1545667369]
HELLO
HELLO

```

b)

Z2_NodeB

```

Z2_Main x Z2_NodeA x Z2_NodeB x
C:\Users\radek\.jdk\openjdk-16\bin\java.exe ...
Node B: config: Config(SimpleConfigObject({"akka":{"actor":{"provider":"cluster"},"cluster":{"downing-provider-class":"akka.cluster.sbr.SplitBrainResolverProvider"},"seed-no
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.event.slf4j.Slf4jLogger - Slf4jLogger started
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.remote.artery.tcp.ArteryTcpTransport - Remoting started with transport [Artery tcp]; listening on address [akka://
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Starting up, Akka version [2.6.14] ...
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Registered cluster JMX MBean [akka:type=Clu
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Started up successfully
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.sbr.SplitBrainResolver - SBR started. Config: strategy [KeepMajority], stable-after [20 seconds], down-all
creating receive for text service
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Received InitJoin message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Received InitJoin message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Received InitJoin message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Received InitJoin message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Received InitJoinAck message from [Actor[ak
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2552] - Welcome from [akka://ClusterSystem@127.0.0.
request: hello
sending to worker: Actor[akka://ClusterSystem@127.0.0.1:2551/user/upper1#575370715]
sending to worker: Actor[akka://ClusterSystem@127.0.0.1:2551/user/upper2#-556061530]

```

Z2_NodeA

```

Z2_Main x Z2_NodeA x Z2_NodeB x
C:\Users\radek\.jdk\openjdk-16\bin\java.exe ...
Node A: config: Config(SimpleConfigObject({"akka":{"actor":{"provider":"cluster"},"cluster":{"downing-provider-class":"akka.cluster.sbr.SplitBrainResolverProvider"},"seed-node
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.event.slf4j.Slf4jLogger - Slf4jLogger started
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.remote.artery.tcp.ArteryTcpTransport - Remoting started with transport [Artery tcp]; listening on address [akka://Cl
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Starting up, Akka version [2.6.14] ...
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Registered cluster JMX MBean [akka:type=Clust
[ClusterSystem-akka.actor.default-dispatcher-5] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Started up successfully
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.sbr.SplitBrainResolver - SBR started. Config: strategy [KeepMajority], stable-after [20 seconds], down-all-t
akka://ClusterSystem/user/upper2 registered
akka://ClusterSystem/user/upper1 registered
[ClusterSystem-akka.actor.default-dispatcher-14] WARN akka.stream.Materializer - [outbound connection to [akka://ClusterSystem@127.0.0.1:2552], control stream] Upstream failed
[ClusterSystem-akka.actor.default-dispatcher-14] WARN akka.stream.Materializer - [outbound connection to [akka://ClusterSystem@127.0.0.1:2552], message stream] Upstream failed
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Received InitJoin message from [Actor[akka://
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Received InitJoinAck message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Node [akka://ClusterSystem@127.0.0.1:2551] 3
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - is the new leader among reachable nodes (mor
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Leader is moving node [akka://ClusterSystem@
[ClusterSystem-akka.actor.default-dispatcher-3] INFO akka.cluster.sbr.SplitBrainResolver - This node is now the leader responsible for taking SBR decisions among the reachab
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Received InitJoin message from [Actor[akka:
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Sending InitJoinAck message from node [akka:
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Node [akka://ClusterSystem@127.0.0.1:2552] 3
[ClusterSystem-akka.actor.default-dispatcher-14] INFO akka.cluster.Cluster - Cluster Node [akka://ClusterSystem@127.0.0.1:2551] - Leader is moving node [akka://ClusterSystem
HELLO
HELLO

```

Wnioski:

Komunikacja w klanstrze przebiegła pomyślnie. Do jej przeprowadzenia potrzebny był Recepcjonista który posiada informacje o wszystkich dołączonych do niego aktorach.