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Tarea práctica 4

1. Utiliza el comando search para buscar estados del proceso a lo largo de su ejecución limitada a 100 unidades de tiempo en que no haya ningún token en el conjunto del atributo tokens. Explica el resultado.

Utilizamos el comando:

search PROCESS =>* < N:Oid : Process | nodes: SN:Set{Node}, flows: SF:Set{Flow}, tokens: empty, gtime: GT:Time, resources: SR:Set{Resource} > .

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Solution 29 (state 627)
states: 628  rewrites: 641228 in 1484ms cpu (3848ms real) (431985 rewrites/second)
N:Oid --> o
SN:Set{Node} --> start(id("n00"), id("f00")), end(id("n05"), id("f06")), end(id("n08"), id("f13")), end(id("n25"), id("f28")), split(id("n04"),
    exclusive, id("f03"), (id("f04"), id("f05"), id("f06"))), split(id("n10"), exclusive, id("f08"), (id("f09"), id("f10"))), split(id("n13"),
    parallel, id("f29"), (id("f17"), id("f21"))), split(id("n15"), parallel, id("f11"), (id("f14"), id("f15"), id("f16"))), split(id("n20"),
    exclusive, id("f22"), (id("f23"), id("f24"))), merge(id("n02"), exclusive, (id("f01"), id("f04")), id("f02")), merge(id("n17"), parallel, (id(
    "f15"), id("f17")), id("f18")), merge(id("n19"), parallel, (id("f19"), id("f20")), id("f22")), merge(id("n23"), exclusive, (id("f25"), id("f26")),
    id("f27")), merge(id("n24"), parallel, (id("f21"), id("f27")), id("f28")), task(id("n01"), "Sign in", id("f00"), id("f01"), 2, empty), task(id(
    "n03"), "Search products", id("f02"), id("f03"), 2, empty), task(id("n06"), "Make an order", id("f05"), id("f07"), 2, empty), task(id("n07"),
    "Fill in feedback form", id("f12"), id("f13"), 2, empty), task(id("n09"), "Check availability", id("f07"), id("f08"), 2, id("clerk")), task(id(
    "n11"), "Cancel order", id("f09"), id("f12"), 2, id("clerk")), task(id("n12"), "Pay for order", id("f14"), id("f29"), 2, empty), task(id("n14"),
    "Confirm order", id("f10"), id("f11"), 2, id("clerk")), task(id("n16"), "Prepare parcel", id("f16"), id("f19"), 2, id("worker")), task(id("n18"),
    "Payment validation", id("f18"), id("f20"), 2, empty), task(id("n21"), "Deliver by drone", id("f23"), id("f25"), 2, id("drone")), task(id("n22"),
    "Deliver by car", id("f24"), id("f26"), 2, (id("car"), id("delivery man")))
SF:Set{Flow} --> flow(id("f00"), 2), flow(id("f01"), 2), flow(id("f02"), 2), flow(id("f03"), 2), flow(id("f04"), 2), flow(id("f05"), 2), flow(id(
    "f06"), 2), flow(id("f07"), 2), flow(id("f08"), 2), flow(id("f09"), 2), flow(id("f10"), 2), flow(id("f11"), 2), flow(id("f12"), 2), flow(id(
    "f13"), 2), flow(id("f14"), 2), flow(id("f15"), 2), flow(id("f16"), 2), flow(id("f17"), 2), flow(id("f18"), 2), flow(id("f19"), 2), flow(id(
    "f20"), 2), flow(id("f21"), 2), flow(id("f22"), 2), flow(id("f23"), 2), flow(id("f24"), 2), flow(id("f25"), 2), flow(id("f26"), 2), flow(id(
    "f27"), 2), flow(id("f28"), 2), flow(id("f29"), 2)
GT:Time --> 94
SR:Set{Resource} --> resource(id("car"), 1, 1), resource(id("clerk"), 1, 1), resource(id("delivery man"), 1, 1), resource(id("drone"), 1, 1),
    resource(id("worker"), 1, 1)

No more solutions.
states: 640  rewrites: 656862 in 1546ms cpu (4003ms real) (424638 rewrites/second)
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Para comprobar los estados del proceso donde el atributo de tokens este vacío. La limitación de las unidades de tiempo se realizó en la regla tick (línea 201), haciendo que esta regla se ejecute mientras la actualización del tiempo sea menor o igual a 100 unidades.

Maude nos proporciona un total de 29 soluciones, siendo estas todas aquellas donde el token alcanza un nodo final como lo son n05 o n08, ya que, la única forma de no tener ningún token, es que la ejecución del programa haya acabado.

2. Utiliza el comando search para verificar si hay situaciones de bloqueo para ejecuciones del proceso antes del transcurso de 100 unidades de tiempo. Explica el resultado.

Utilizamos el comando:

search PROCESS =>! < N:Oid : Process | nodes: SN:Set{Node}, flows: SF:Set{Flow}, tokens: ST:Set{Token}, gtime: GT:Time, resources: SR:Set{Resource} > .

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Solution 63 (state 639)
states: 640  rewrites: 656862 in 2125ms cpu (5826ms real) (309111 rewrites/second)
N:Oid --> o
SN:Set{Node} --> start(id("n00"), id("f00")), end(id("n05"), id("f06")), end(id("n08"), id("f13")), end(id("n25"), id("f28")), split(id("n04"),
    exclusive, id("f03"), (id("f04"), id("f05"), id("f06"))), split(id("n10"), exclusive, id("f08"), (id("f09"), id("f10"))), split(id("n13"),
    parallel, id("f29"), (id("f17"), id("f21"))), split(id("n15"), parallel, id("f11"), (id("f14"), id("f15"), id("f16"))), split(id("n20"),
    exclusive, id("f22"), (id("f23"), id("f24"))), merge(id("n02"), exclusive, (id("f01"), id("f04")), id("f02")), merge(id("n17"), parallel, (id(
    "f15"), id("f17")), id("f18")), merge(id("n19"), parallel, (id("f19"), id("f20")), id("f22")), merge(id("n23"), exclusive, (id("f25"), id("f26")),
    id("f27")), merge(id("n24"), parallel, (id("f21"), id("f27")), id("f28")), task(id("n01"), "Sign in", id("f00"), id("f01"), 2, empty), task(id(
    "n03"), "Search products", id("f02"), id("f03"), 2, empty), task(id("n06"), "Make an order", id("f05"), id("f07"), 2, empty), task(id("n07"),
    "Fill in feedback form", id("f12"), id("f13"), 2, empty), task(id("n09"), "Check availability", id("f07"), id("f08"), 2, id("clerk")), task(id(
    "n11"), "Cancel order", id("f09"), id("f12"), 2, id("clerk")), task(id("n12"), "Pay for order", id("f14"), id("f29"), 2, empty), task(id("n14"),
    "Confirm order", id("f10"), id("f11"), 2, id("clerk")), task(id("n16"), "Prepare parcel", id("f16"), id("f19"), 2, id("worker")), task(id("n18"),
    "Payment validation", id("f18"), id("f20"), 2, empty), task(id("n21"), "Deliver by drone", id("f23"), id("f25"), 2, id("drone")), task(id("n22"),
    "Deliver by car", id("f24"), id("f26"), 2, (id("car"), id("delivery man")))
SF:Set{Flow} --> flow(id("f00"), 2), flow(id("f01"), 2), flow(id("f02"), 2), flow(id("f03"), 2), flow(id("f04"), 2), flow(id("f05"), 2), flow(id(
    "f06"), 2), flow(id("f07"), 2), flow(id("f08"), 2), flow(id("f09"), 2), flow(id("f10"), 2), flow(id("f11"), 2), flow(id("f12"), 2), flow(id(
    "f13"), 2), flow(id("f14"), 2), flow(id("f15"), 2), flow(id("f16"), 2), flow(id("f17"), 2), flow(id("f18"), 2), flow(id("f19"), 2), flow(id(
    "f20"), 2), flow(id("f21"), 2), flow(id("f22"), 2), flow(id("f23"), 2), flow(id("f24"), 2), flow(id("f25"), 2), flow(id("f26"), 2), flow(id(
    "f27"), 2), flow(id("f28"), 2), flow(id("f29"), 2)
ST:Set{Token} --> token(id("f06"), 2)
GT:Time --> 100
SR:Set{Resource} --> resource(id("car"), 1, 1), resource(id("clerk"), 1, 1), resource(id("delivery man"), 1, 1), resource(id("drone"), 1, 1),
    resource(id("worker"), 1, 1)

No more solutions.
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Salen un total de 63 soluciones, debido a que es el número de iteraciones donde un token alcanza un nodo final, más los estados bloqueantes donde se le acaba el tiempo al token.