

Building Block Definition

- Traffic Model
- Command
- Send Request
- Carrier Sense
- Collision Check
- Random Back-off
- ACK
- Wait ACK
- Wait Grant
- Grant
- Transmit Queue
- Transmit
- Performance

Building Block Definition

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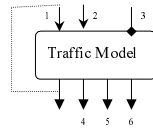
			CPR	UmLink	ADAP	MLAP	PRMA	D-TDMA
Traffic Model	Arrival	Poisson						
		Uniform	✓	✓	✓	✓	✓	✓
		Bernoulli						
	Length	Gaussian						
		Uniform	✓	✓	✓	✓	✓	✓
		Exponential						
Frame Structure	Reservation			✓	✓		✓	✓
	Available			✓	✓		✓	✓
	CMS		✓			✓		✓
	DMS		✓			✓		
	Data		✓	✓	✓	✓	✓	✓
Station / H/E Mobile / Base	Send request		✓	✓	✓	✓	✓	✓
	Carrier sense			✓	✓			
	Collision check		✓	✓	✓	✓	✓	✓
	Random backoff ²		✓	✓	✓	✓	✓	✓
	Wait ACK		✓			✓		
	Wait Grant		✓			✓		
	Transmit		✓			✓	✓	✓
	Command		✓	✓	✓	✓	✓	✓
	Ack		✓			✓		
	Grant		✓	✓	✓	✓	✓	✓

Table 2.1

Building Block Definition

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Traffic Model



- 1 Quantity[n]
- 2 SendGrantId
- 3 MoreTrafficFlag
- 4 Traffic[n]
- 5 TotalAmount[n]
- 6 MoreTraffic[n]

Options:

Numbers of station : n			
Arrival Model	Poisson		
	Uniform		
	Bernoulli		
Length Model	Gaussian	Mean	
	Uniform	Mean	
	Exponential	Mean	

Users should assign numbers of stations "n".

Building Block Definition

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Traffic Model

Input :

Parameter	Type	Explanation
Quantity[n]	Array ; Integer ¹	Station i can generate new traffic until Quantity[i] = 0
SendGrantId	Integer	Output of the block Grant
MoreTrafficFlag	Boolean	Output of the block Command

Output:

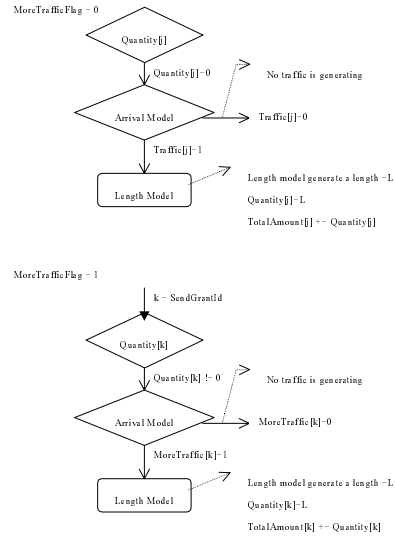
Parameter	Type	Explanation
Traffic[n]	Array ; Boolean ²	Traffic[i] = "T" means station i has traffic to send
Quantity[n]	Array ; integer	Quantity[i] = traffic length for the station i
TotalAmount[n]	Array ; integer	TotalAmount[i] = so far traffic amounts of the station i have been generated
MoreTraffic[n]	Array ; Boolean	MoreTraffic[i] = "T" means station i has more traffic to send. But this parameter is valid when MoreTrafficFlag = "T".

Building Block Definition

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Traffic Model

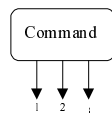
Process :



Building Block Definition

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Command



1. ContentionFlag
2. TransmitFlag
3. MoreTrafficFlag

Output :

Parameter	Type	Explanation
ContentionFlag	Boolean	Use these flags to trigger building blocks in order to meet different protocols' constraints
TransmitFlag	Boolean	
MoreTrafficFlag	Boolean	

Building Block Definition

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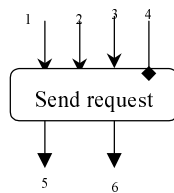
Command

Frame structure	Options			No.	Example / Notes
Reservation overhead	Available	Minislot	Yes		D-TDMA
			No		
Fix frame structure	Data				CPR MLAP
	CMS				
	DMS				
Dynamic frame structure	I	Available	Minislot	Yes	PRMA Ratio between available and reservation slots is assigned by users
				No	
	Reservation				
	II	Available	Minislot	Yes	
			No		
Reservation					

Building Block Defination

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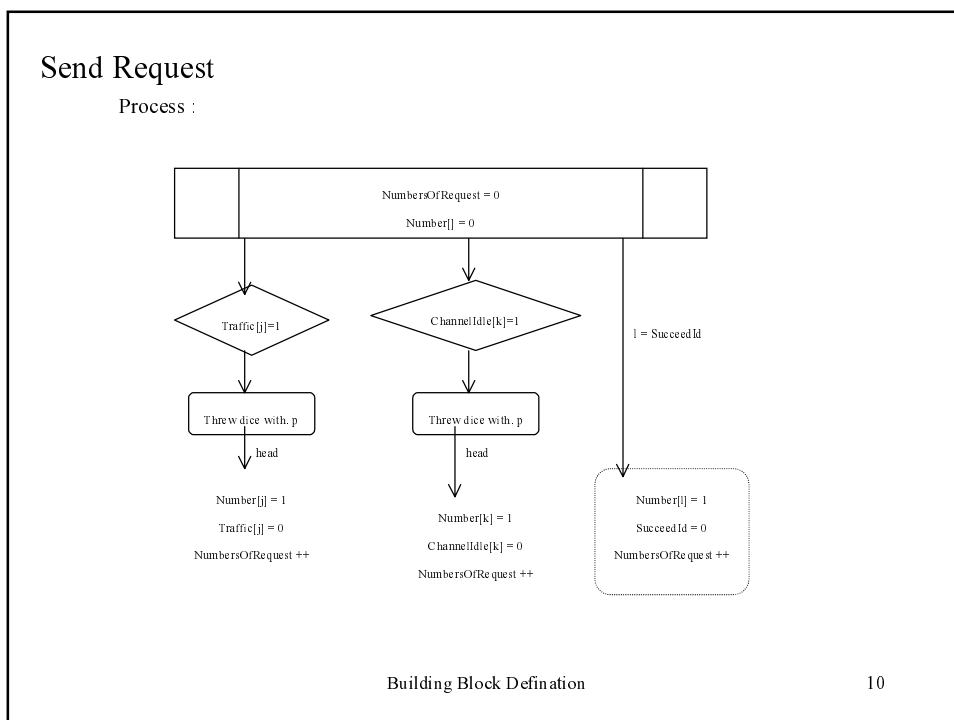
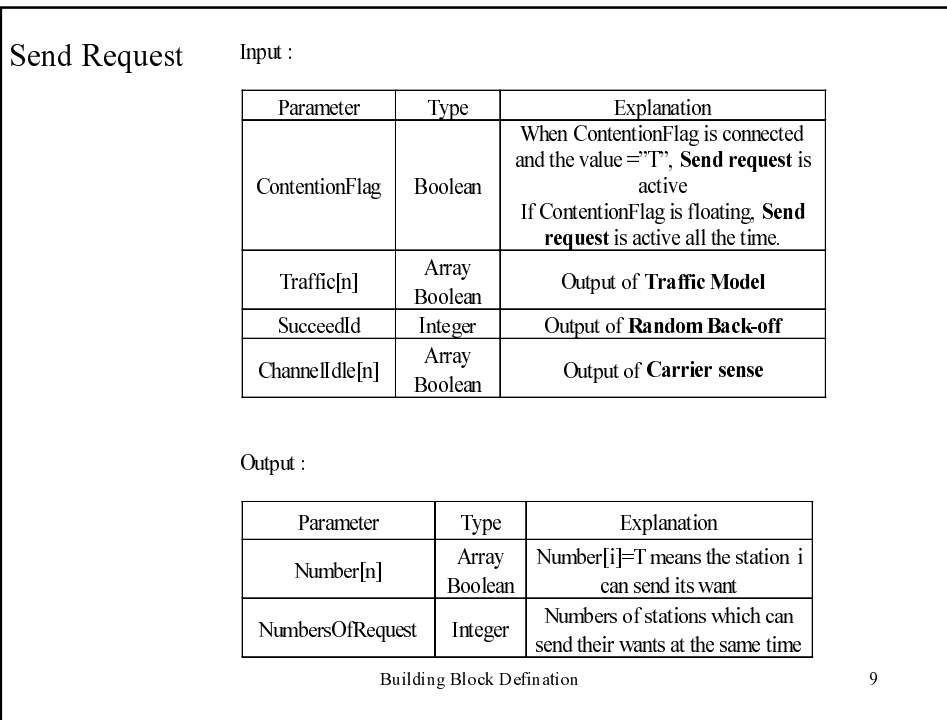
Send Request



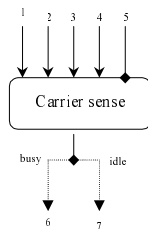
1. Traffic[n]
2. SucceedId
3. ChannelIdle[n]
4. ContentionFlag
5. Number[n]
6. NumbersOfRequest

Building Block Defination

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Carrier Sense



1. Traffic[n]
2. ChannelBusy[n]
3. NumbersOfRequest
4. Succeeded
5. ContentionFlag
6. ChannelBusy[n]
7. ChannelIdle[n]

Building Block Definition

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Carrier Sense

input :

Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value = "T", Carrier sense is active. If ContentionFlag is floating, Carrier sense is active all the time.
NumbersOfRequest	Integer	Numbers of the stations which send their request at the same time
Traffic[n]	Array ; Boolean	Output of Traffic Model
ChannelBusy[n]	Array ; Boolean	If the channel is busy, it may need to sense the channel again.
Succeeded	Integer	Output of Random Back-off

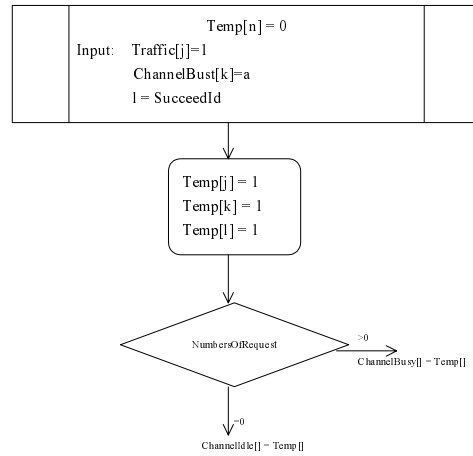
Output :

Parameter	Type	Explanation
ChannelIdle [n] ChannelBusy[n]	Array ; Boolean	Sense the channel. If channel is busy, output will be ChannelBusy[n], otherwise, output will be ChannelIdle[n]

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Carrier Sense

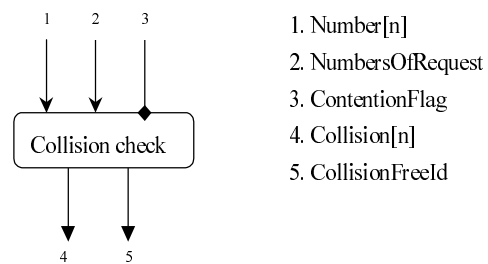
Process :



Building Block Defination

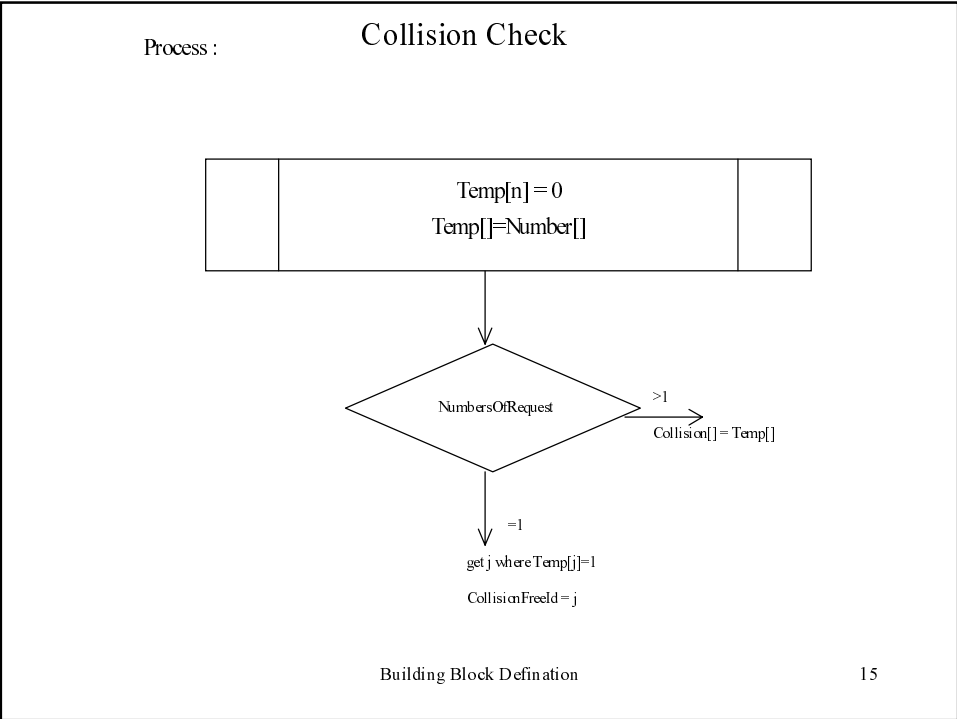
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Collision Check



Building Block Defination

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Collision Check

Input :

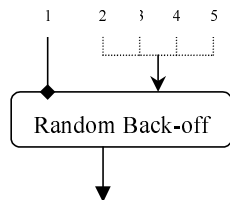
Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value = "T", Collision check is active If ContentionFlag is floating, Collision check is active all the time.
Number[n]	Array Boolean	Number[i]=T means the station i can send its want
NumbersOfRequest	Integer	Numbers of stations which can send their want at the same time

Output :

Parameter	Type	Explanation
Collision[n]	Array Boolean	Collision[i]="T" means station i did not send its request successfully.
CollisionFreeId	Integer	Station id which send its request successfully

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Random Back-off



1. ContentionFlag
2. NoAck[n]
3. Collision[n]
4. ChannelBusy[n]
5. ChannelIdle[n]
6. SucceedId

Building Block Defination

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Random Back-off

Option :

		Parameter
Case I	Dice with probability p (p-persistent algorithm)	p
Case II	Start-n (splitting algorithm)	n
Case III	Assign back-off value	b[0],b[1],b[2],.....b[n]
Case IV	Binary exponential	

Building Block Defination

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Input : **Random Back-off**

Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value = "T", Random Back-off is active If ContentionFlag is floating, Random Back-off is active all the time.
NoACK[n] Collision[n] ChannelBusy[n] ChannelIdle[n]	Array ; Boolean	

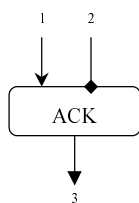
Output :

Parameter	Type	Explanation
SucceedId	Integer	Station which can send its request again

Building Block Defination

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ACK



1. CollisionFreeId
2. ContentionFlag
3. AckId

Input :

Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value = "T", ACK is active If ContentionFlag is floating, ACK is active all the time.
CollisionFreeId	integer	Output of Collision check

Building Block Defination

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ACK

Output :

Parameter	Type	Explanation
AckId	integer	Station which sends its request successfully

Process :

AckId = 0

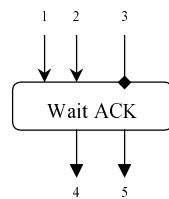
Temp = 0

Temp = CollisionFreeId

AckId = temp

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Wait ACK



1. Number[n]
2. AckId
3. ContentionFlag
4. NoAck[n]
5. ReceiveAckId

Option : propagation delay = D (assign by users)

Building Block Definition

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Input : **Wait ACK**

Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value ="T", Wait ACK is active If ContentionFlag is floating, Wait ACK is active all the time.
Number[n]	Array Boolean	Output of Send request
AckId	Integer	Output of ACK

Output :

Parameter	Type	Explanation
NoAck [n]	Array Boolean	NoAck[i]="T" means station i didn't send its request successfully
ReceiveAck	Integer	Station which send its request successfully id

Building Block Defination

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Process :

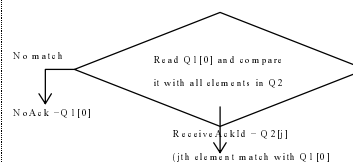
Wait ACK

Two FIFO queues (Q1,Q2) with size D
Q1 stores the parameter Number[]
Q2 stores the parameter AckId

```

For (i=0 , i<D , i++)
{
    count = 0;
    temp3 = 0;
    temp1[.] = Q1[i];
    temp2 = Q2[i];
    temp1[temp2] = 0
    for (j=1, j<=n , j++)
    {if (temp1[j]==1)
    {count++ ; }}
    if (count==0)
    {temp3 = 1;
    temp4 = i;
    break;}
}
if (temp3 ==1)
{ReceiveAckId = Q2[temp4];}
else
{NoAck[.] = Q1[i];}

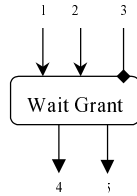
```



Block Defination

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Wait Grant



1. ReceiveAckId
2. SendGrantId
3. ContentionFlag
4. ReceiveGrantId
5. TimeOut

Option : time_out = Time (assign by users)

Building Block Defination

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Input :

Wait Grant

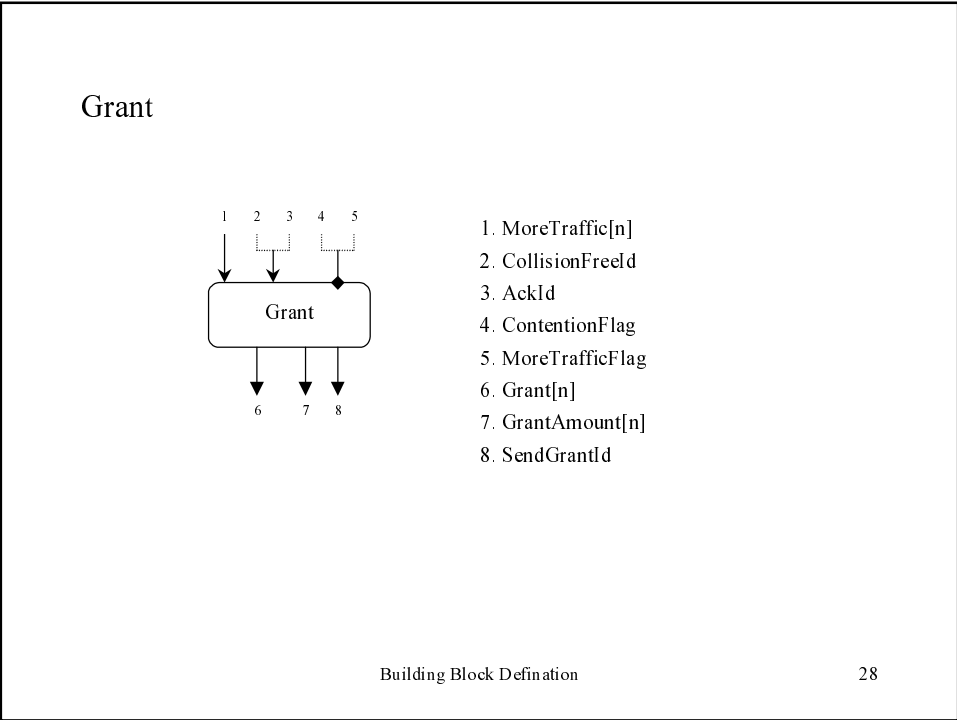
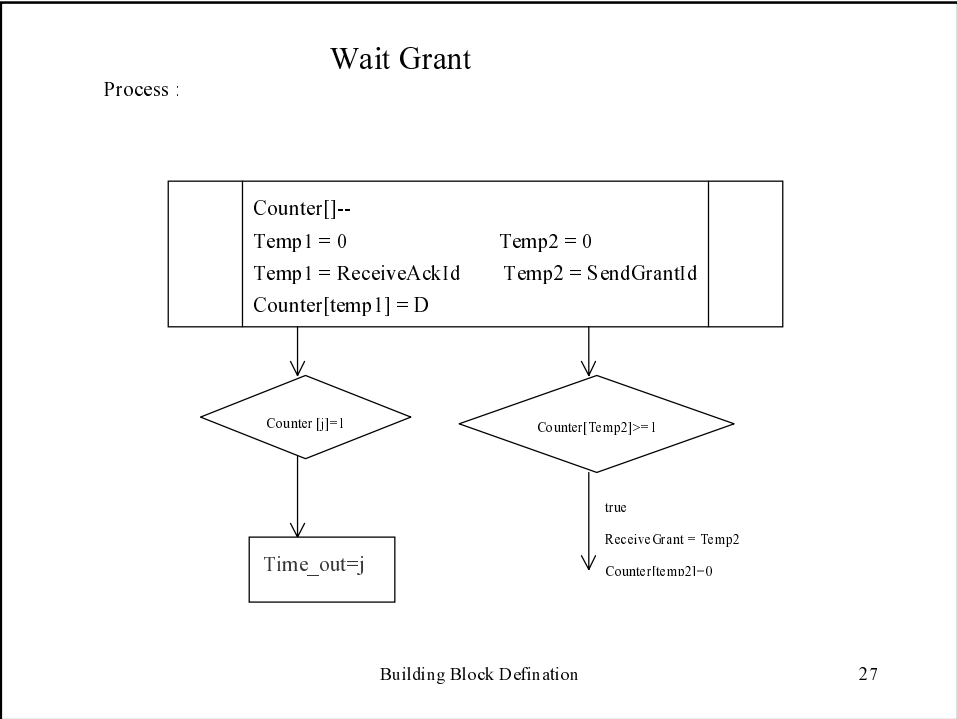
Parameter	Type	Explanation
ContentionFlag	Boolean	When ContentionFlag is connected and the value = "T", Wait Grant is active If ContentionFlag is floating, Wait grant is active all the time.
ReceiveAckId	Integer	Output of ACK
SendGrantId	Integer	Output of Grant

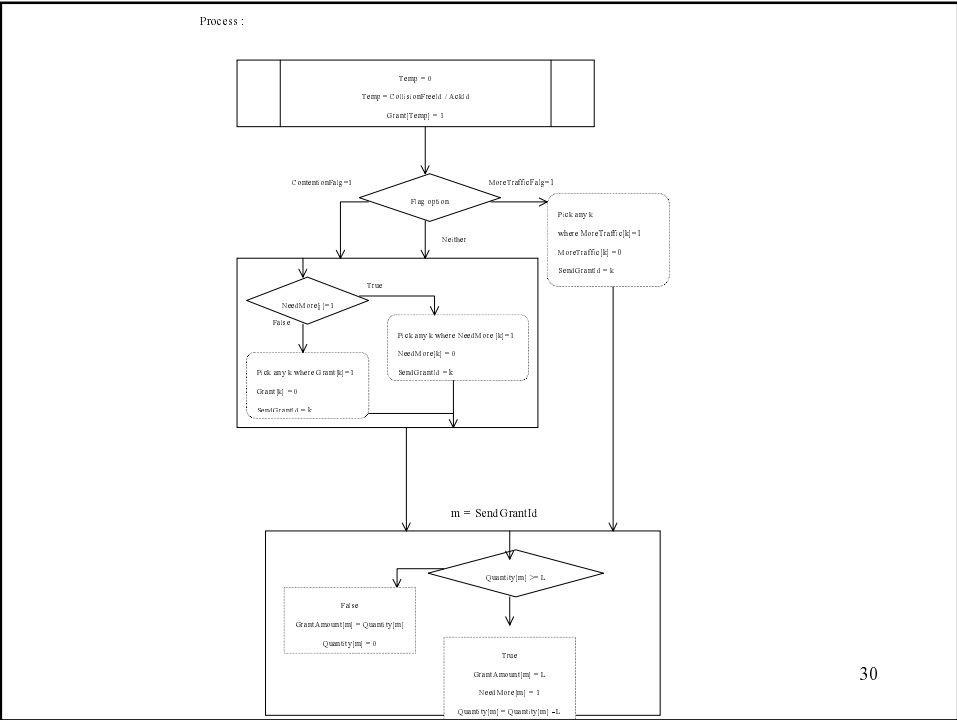
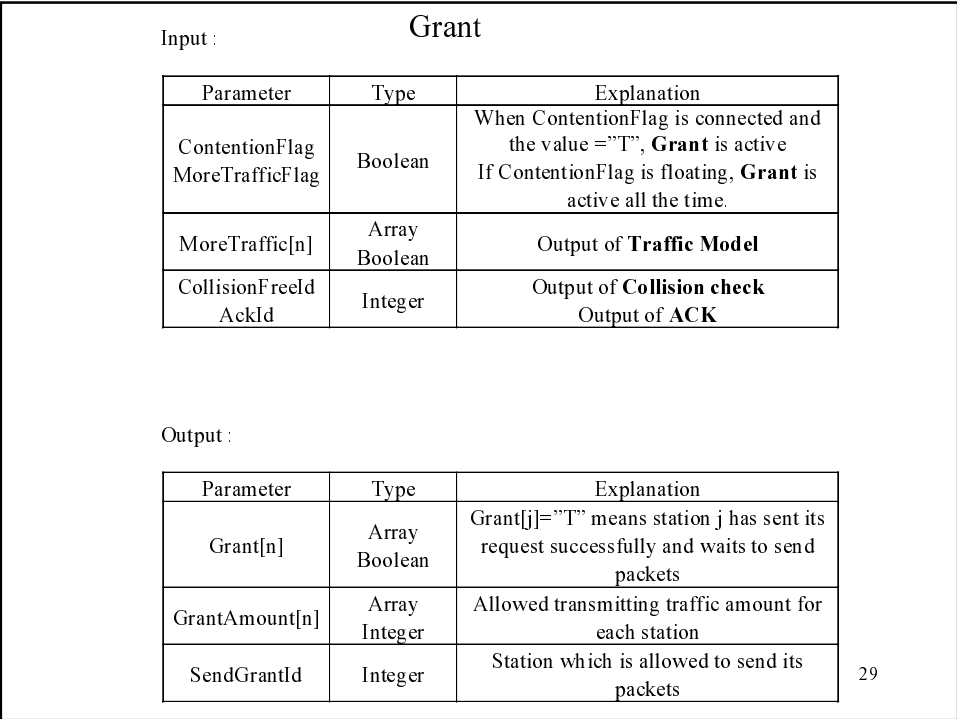
Output :

Parameter	Type	Explanation
ReceiveGrantId	Integer	Station which gets the permission to send packets
TimeOut	Integer	Station which does not get the permission in time to send packets

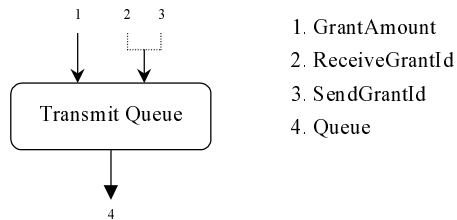
Building Block Defination

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Transmit Queue

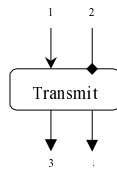


1. GrantAmount
2. ReceiveGrantId
3. SendGrantId
4. Queue

Building Block Definition

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Transmit



1. Queue
2. TransmitQueue
3. TotalSendAmount
4. EachSendAmount[n]

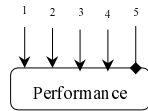
Output :

Parameter	Type	Explanation
TotalSendAmount	Integer	Accumulate sending traffic amounts in order to calculate throughput
EachSendAmount[n]	Array ; Integer	Accumulate each station's sending traffic amount in order to calculate delay

Building Block Definition

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Performance



1. TimeOut
2. TotalAmount
3. TotalSendAmount
4. EachSendAmount
5. ContentionFlag

Input :

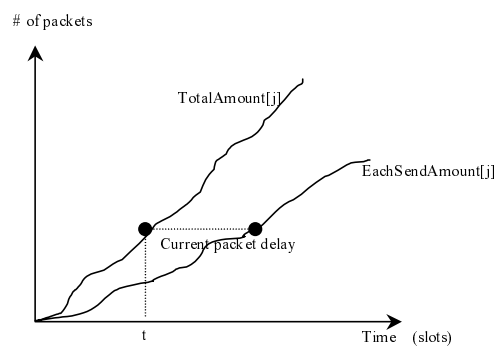
Parameter	Type	Explanation
TimeOut	Integer	Output of block WaitGrant
TotalAmount[n]	Array ; Integer	Output of the block Traffic Model
TotalSendAmount	Integer	Output of the block Transmit
EachSendAmount[n]	Array ; Integer	Output of the block Transmit
ContentionFlag	Boolean	Output of the block Command

Building Block Defination

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Performance

For station (mobile) j



Building Block Defination

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