CS 565 – Scientific Computing

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COMPUTER SCIENCE

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Welcome

You will never win, If you never Begin.

Helen Rowland

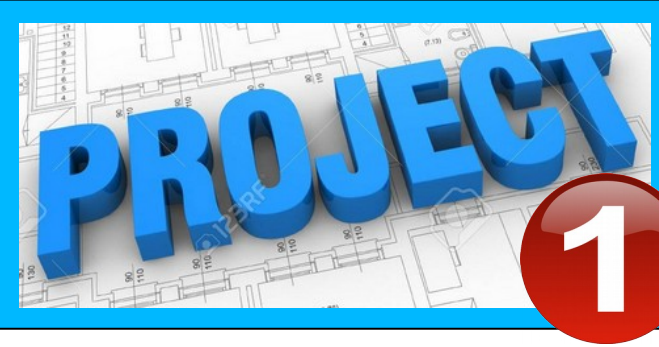
Dr Cavalcanti

a/k/a Dr. Color Candy or Dr. C

PROJECT 1

Activity

Satellite Simulator



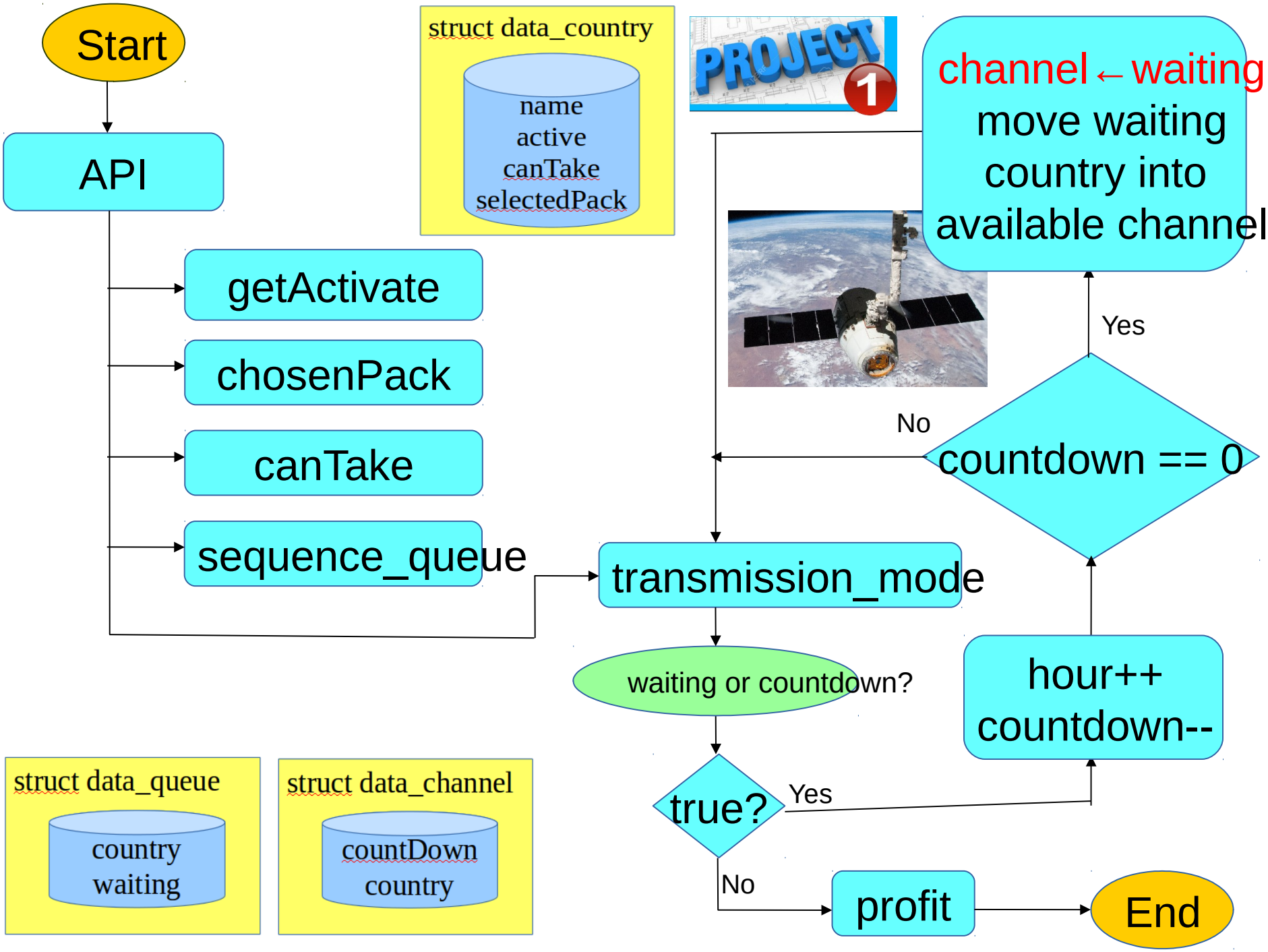
Activity

Satellite Simulator

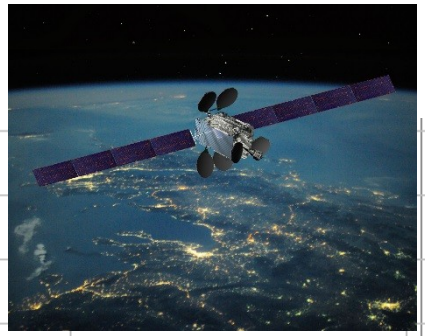
Implement the described model using event simulation:

satellite controller system, having the following features …

1. **Define a data structure that has following variables: countries {USA, China, Germany, Japan, Switzerland}, Package {Tera-byte types: 1, 2, 3, 4}, price per package transmission according to package type {1:$210, 2:$350, 3:$400, 4:$500}, timeTrasmission {time needed to send the package type according to the respective package – 1: 1 hour; 2: 3 hours; 3: 5 hours, 4: 10 hours}, requestedTransmission {Off or On: 0 or 1}. *(3 points)***
2. **The satellite can attend only 2 countries at the same time each time – so it has only two transmission channels. *(2 points)***
3. **Define stochastically/randomly if a country has requested to send transmission. *(1 point)***
4. **If countries have requestedTransmission, then apply uniform random values for: waiting list that will comprise the countries in queue waiting to be next to transmit data, comprising the list that contains the countries using their number according to their position in the vector that contains 5 countries; Note: as the generated values sequence is random, apply the rule that a country can not occupy two channel at the same time. *(2 points)***
5. **Consider that the satellite will attend each activated country and service all countries in the waiting list; the satellite will run for 48 hours and then rest for maintenance. Give the total of hours that was required to attend the countries that have requested data transmission and how much the satellite company earned from the countries according to their data transmission. Use Spyder to generate a plot on country activation. *(2 points)***

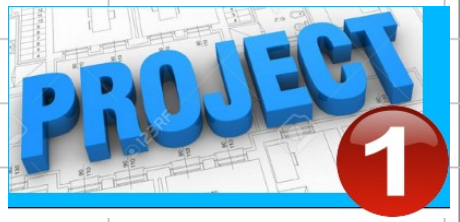

Start
API
struct data_country
name
active
canTake
selectedPack
PROJECT 1
channel ← waiting
move waiting country into available channel
getActivate
chosenPack
canTake
sequence_queue
Yes
No
countdown == 0
transmission_mode
waiting or countdown?
hour++
countdown--
true?
Yes
No
profit
End
struct data_queue
country
waiting
struct data_channel
countDown
country

Modeling & Steps



Country	Activated	canTAKE	chosenPACK
USA	1	0	3
China	1	0	1
Japan	0	0	9999
Switzerland	0	0	9999
Germany	1	0	4

Step 1	Activated = Random{ 0, 1 }
Step 2	ChosenPACK = { 1 , 4 }
	TypePACK[i]. hours { 1 , 3, 5, 10 }
Step 3	Copy :: canTAKE = Activated
Step 4	Sequence[5].country = Random { 1 , 5 }



Step 5

```
While ( TRUE ) :: Run time, each loop time is one hour
        Hour++
        Channel [ 2 ].countDOWN--;
        if (Channel [ k ].countDOWN == 0)
                if (Sequence[ I ].waiting == 1)
                    Channel [ k ].country = Sequence[ I ].country
```