

Computational Method Winter Semester 2013/2014

All students who want to make the lecture „Rechnergestützte Netzanalyse“ as computational method need to do the following task. The model should be sent as a spp-file to bing.bai@uni-due.de together with the completed scan form (You need to complete all information such as your name, study number, Email address and so on. Please don't fill in the note in the form) before **April. 19th 2014.**

The name of spp-file should be:

[Your Name_Your Student ID Number.zip].

The Link for the form of “registration for computational methods”:

https://www.uni-due.de/imperia/md/content/mechanikb/aktuelles/cm_registration_form.pdf

Task:

A computer factory wants to produce four types of computers. (You can set colors and name by yourself as you want). Three types of computers will be sent to warehouse and the last type of computer will be exported based on corresponding labels to China, India and America. Eleven types of elements are needed: material 1, material 2, material 3, material 4, box 1, box 2, box 3, box 4, label china, label India and label America.

Four types of boxes arrive in the production system for packaging of these computers. First of all four different types of papers will be sent to box machine through an accumulated conveyor with length of 5 m and speed of 2 m/s. The box machine makes paper to box for packing of computer. The processing time of the box machine is 2 minutes for one box.

At the same time, four different types of materials arrive in this production system every 1 minute with exponential distribution in cycle sequence (the number of all incoming material 1, 2, 3 and 4 should be 1 in Table). After that, material 1 and material 2 will be sent to machine 1 with processing time of 5 minutes and material 3 and material 4 will be sent to machine 2 with processing time of 6 minutes. After the production of machine 1 and machine 2, four types of materials become to computers. Then computer 1 and 2 will be sent to packaging machine 1 with processing time of 2 minutes and computer 3 and 4 will be sent to packaging machine 2 with processing time of 3 minutes for assembling with the corresponding boxes. Availability and MTTR for these machines are:

	Availability	MTTR
Box Machine	90%	5:00
Machine 1	70%	5:00
Machine 2	60%	10:00

Three work stations will be set for these machines for repair.

After producing and packaging, all of these computers will be delivered through a buffer with capacity of 5 to a main accumulated conveyor with the length of 20 m and

speed of 2 m/s. In this conveyor, there are three sensors for distribution of these computers. Based on these sensors, these computers will be selected per Robert (PlaceAndPick). Computer 2 and computer 3 will be sent to warehouse 1 and computer 1 will be sent to warehouse 2 for storage. After this due to a sudden order, computer factory will export computer 4 to China, India and America. So, the packing of computer 4 should be changed. Computer 4 will be delivered out of the main accumulated conveyor and change its packing box (the original packing box will be separated) with three kinds of labels (label china, label India and label America). These labels are arrived from one entrance with interval time of 5 minutes in Sequence for Table (The number of all incoming label for China should be 200; label for India should be 100 and label for America should be 300 in Table) and they will be processed in one label machine with processing time of 1 minute. The availability and MTTR of the label machine are:

	Availability	MTTR
Label Machine	85%	3:00

Computer 4 with three different types of labels at last will be delivered to final accumulated conveyor with three sensors (5m, 10 m and 15 m) for export. Finally, another Robert (PickAndPlace 2) is responsible for picking up from sensors and sending to exporters of the three countries.

Tip and Question:

1. You just need one Worker Pool for repair.
2. Simulation time should be 1 day.
3. Please find the problem of this production system.
4. Could you give some suggestion for the factory?

```
1.
is
do
  inspect@.name
  when "material1" then
    @.umlagern(machine1);
  when "material2" then
    @.umlagern(machine1);
  when "material3" then
    @.umlagern(machine2);
  when "material4" then
    @.umlagern(machine2);
  end;
end;
```

```
2.
is
do
  inspect@.name
  when "box1" then
    @.umlagern(assembly1);
  when "box2" then
    @.umlagern(assembly1);
  when "box3" then
    @.umlagern(assembly2);
  when "box4" then
    @.umlagern(assembly2);
  end;
end;
```

```
3.
(index:integer)
is
do
  if index = 1 then
    if @.name = "box1" then
      @.umlagern(F_box1);
    end;
  elseif index = 2 then
    if @.name = "box2" then
      @.umlagern(F_box2);
    end;
  elseif index = 3 then
    if @.name = "box3" then
      @.umlagern(F_box3);
    end;
  end;
end;
```

```
        end;
    end;
end;
4.
(index:integer)
is
do
    if index = 1 then
        if @.name = "labelchina" then
            @.umlagern(F_labelchina);
        end;
    elseif index = 2 then
        if @.name = "labelindia" then
            @.umlagern(F_labelindia);
        end;
    elseif index = 3 then
        if @.name = "labelamerika" then
            @.umlagern(F_labelamerika);
        end;
    end;
end;
end;
```