

Repair Service Process Improvement for TCYC

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Background & Motivation

Do you ever
EXPERIENCE.....

國立清華大學學生宿舍修繕工作申請單

Maintenance & Repair Form for National Tsing-Hua University Student Rooms

編號: 149982 Serial Numbers	申請日期(Application Date): 2019/10/28 下午 05:36:38
工作齋別: Dorm Name for work	=選擇齋舍 Select= ▼
室別: Room Number	<input type="text"/> ex:A0101
學號/人事編號: Student ID Number	<input type="text"/> ex:912345 · 學號前不須加字母
姓名: Name	<input type="text"/>
E-mail:	<input type="text"/>
工作類別: Classification	<p>水電檢修(Utility repairs) ▼ <input type="text"/></p> <p>選擇'其他', 請在此空格填寫 If you choose "Others", please fill in the item here</p> <p>*"宿網" 相關業務請勿填寫修繕單, 謝謝!! 校本部請改撥 分機31000、南大校區請改撥 分機7405, 或撥 03-5715131 轉接, 將由專人為您服務! Extension 31000 (main campus) and 76405 (nan-da campus) is offered for calling for repair of dormitory network.</p>
地點: Location for work	<p><input type="radio"/> 寢室 (Room) <input type="radio"/> 公共區域(Public Area)</p> <p>: <input type="text"/></p>



Mixed-content forms



Problem description words



Nothing to help clarify problem



Improvement Methods

How to SOLVE.....



BPR

a business management strategy

to help organizations “**fundamentally**”
rethink how they do their work in order
to improve customer service, cut
operational costs, and become world-
class competitors.



IDEF

a group of modeling methods

to organize system analysis and promote
effective communication between the analyst
and the customer through simplified graphical
devices.



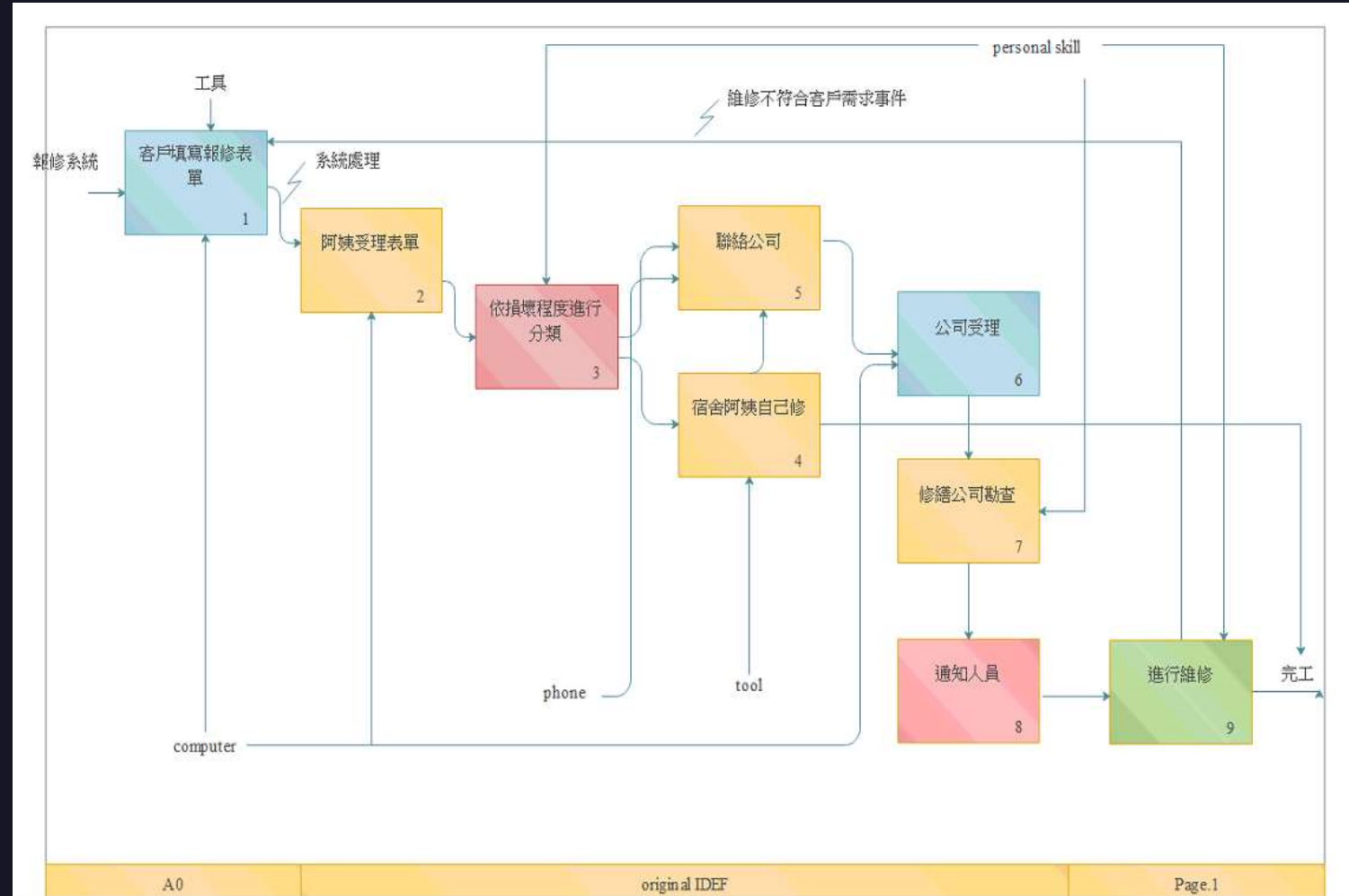
IDEF Analysis & Improvement

IDEF-Original process

Original process

IDEF-A0

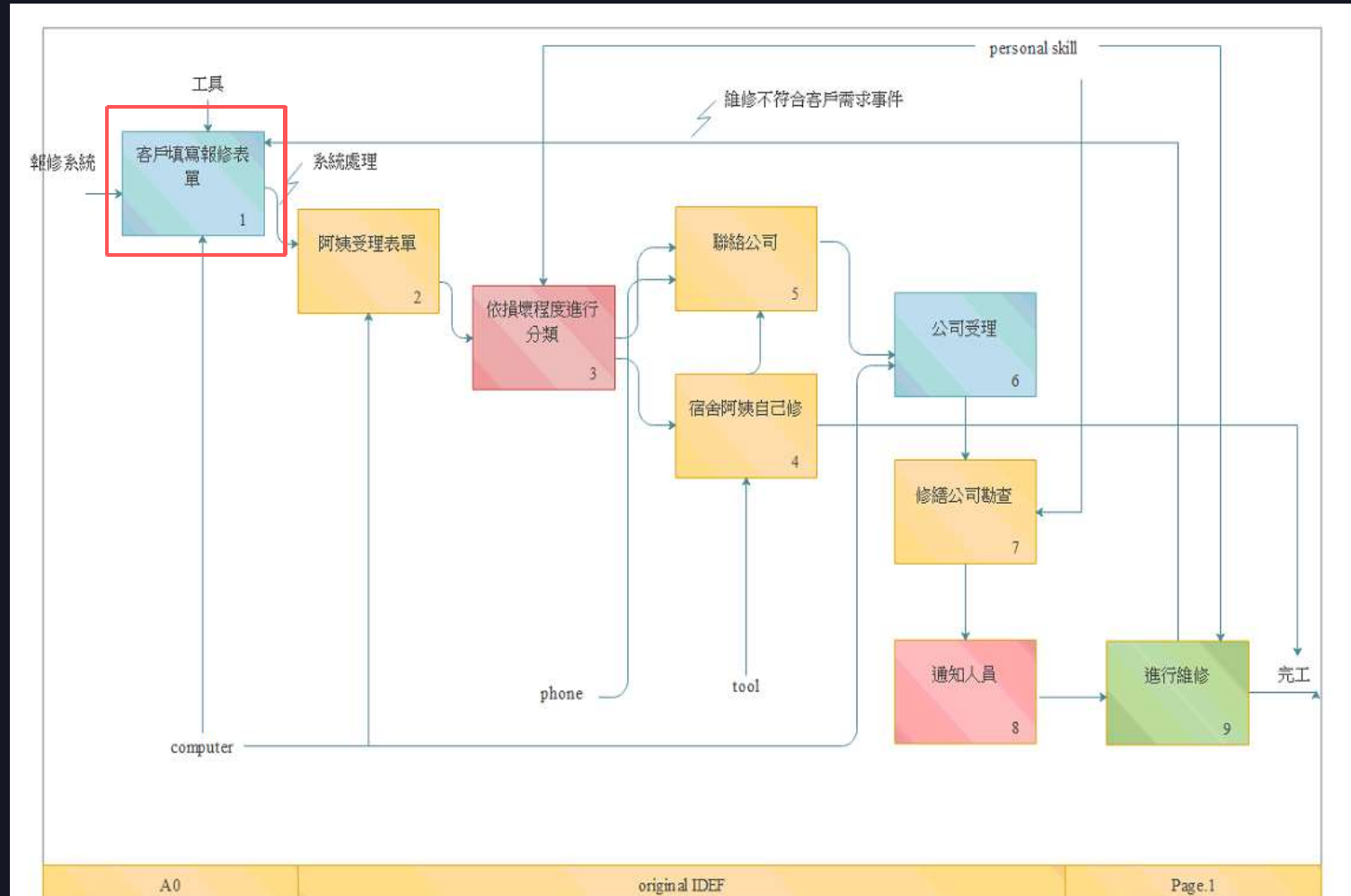
- Fill out the form
- Supervisor handling
- Repair by themselves
- Repair by the company



Original process

IDEF-A1

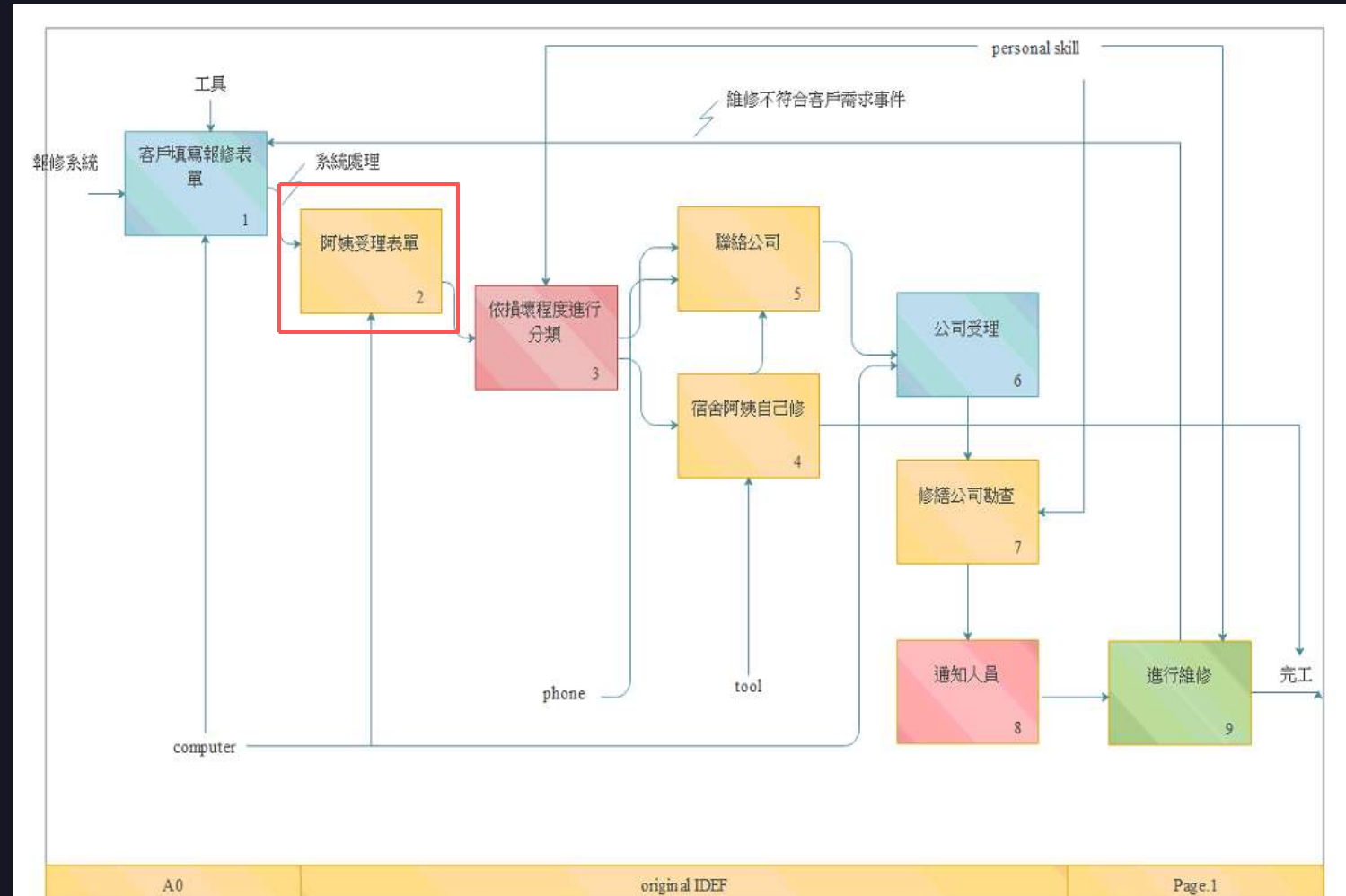
- Order
 - ✓ Login
 - ✓ Fill out the form
 - ✓ Check the order



Original process

IDEF-A2

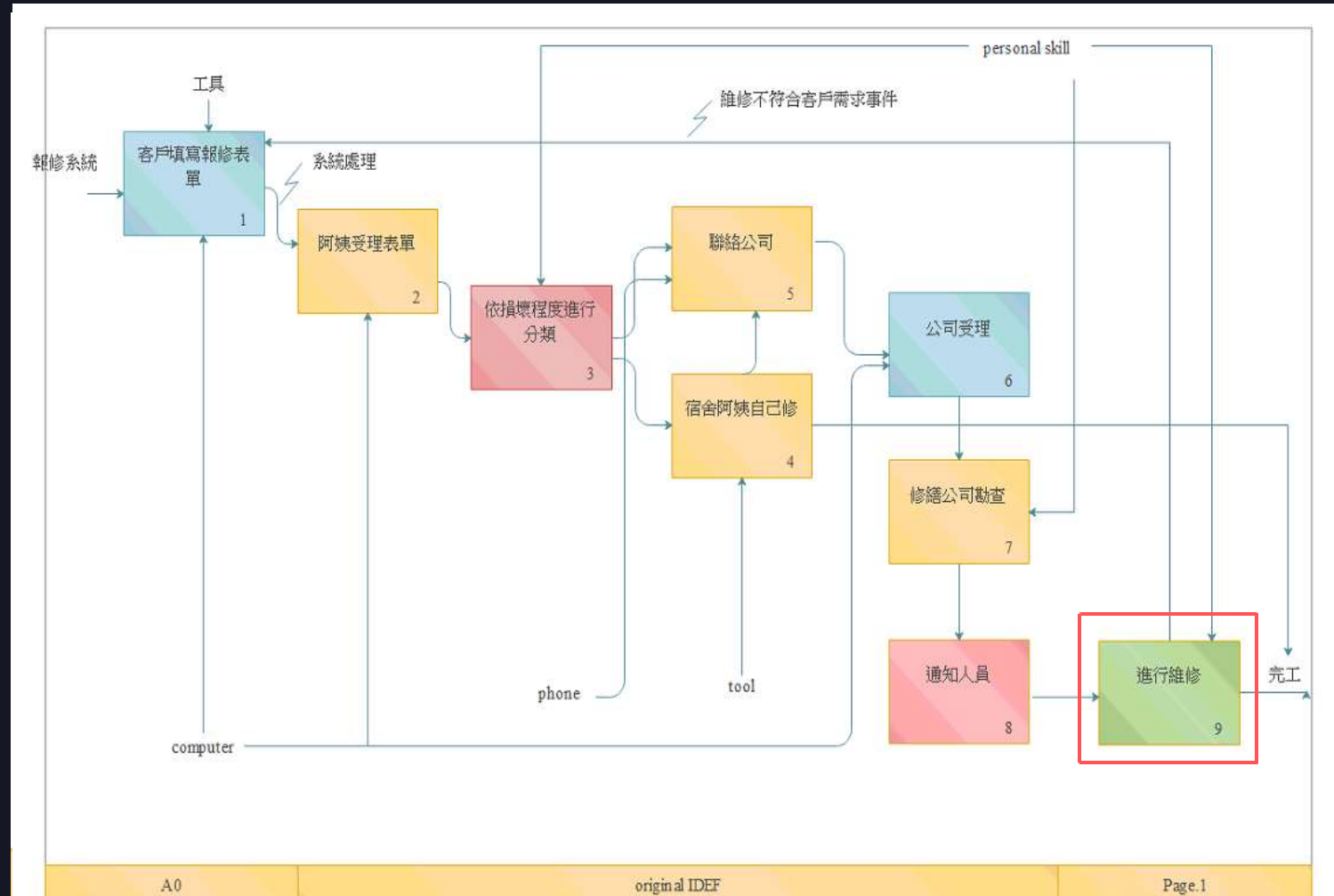
- Order handling by supervisors
 - ✓ Receive the order
 - ✓ Login
 - ✓ Handle the forms



Original process

IDEF-A9

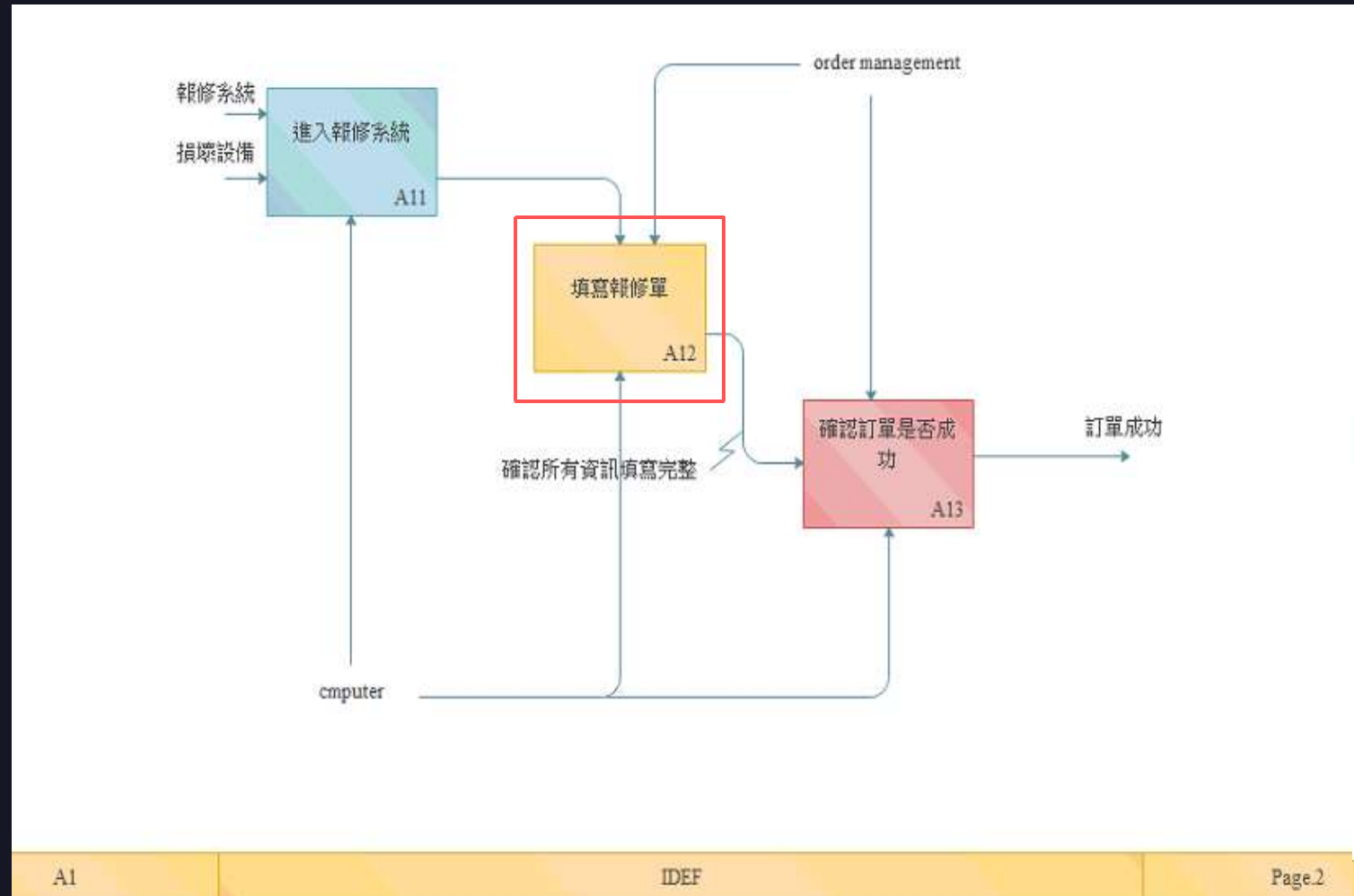
- Maintenance
 - ✓ Get the tools and components
 - ✓ Check the problems
 - ✓ Fix



Original process

IDEF-A12

- Fill out the form
 - ✓ Dormitory
 - ✓ Room
 - ✓ Student ID
 - ✓ Name
 - ✓ E-mail
 - ✓ Maintenance category
 - ✓ Location
 - ✓ Select items for work
 - ✓ Problem description



A1

IDEF

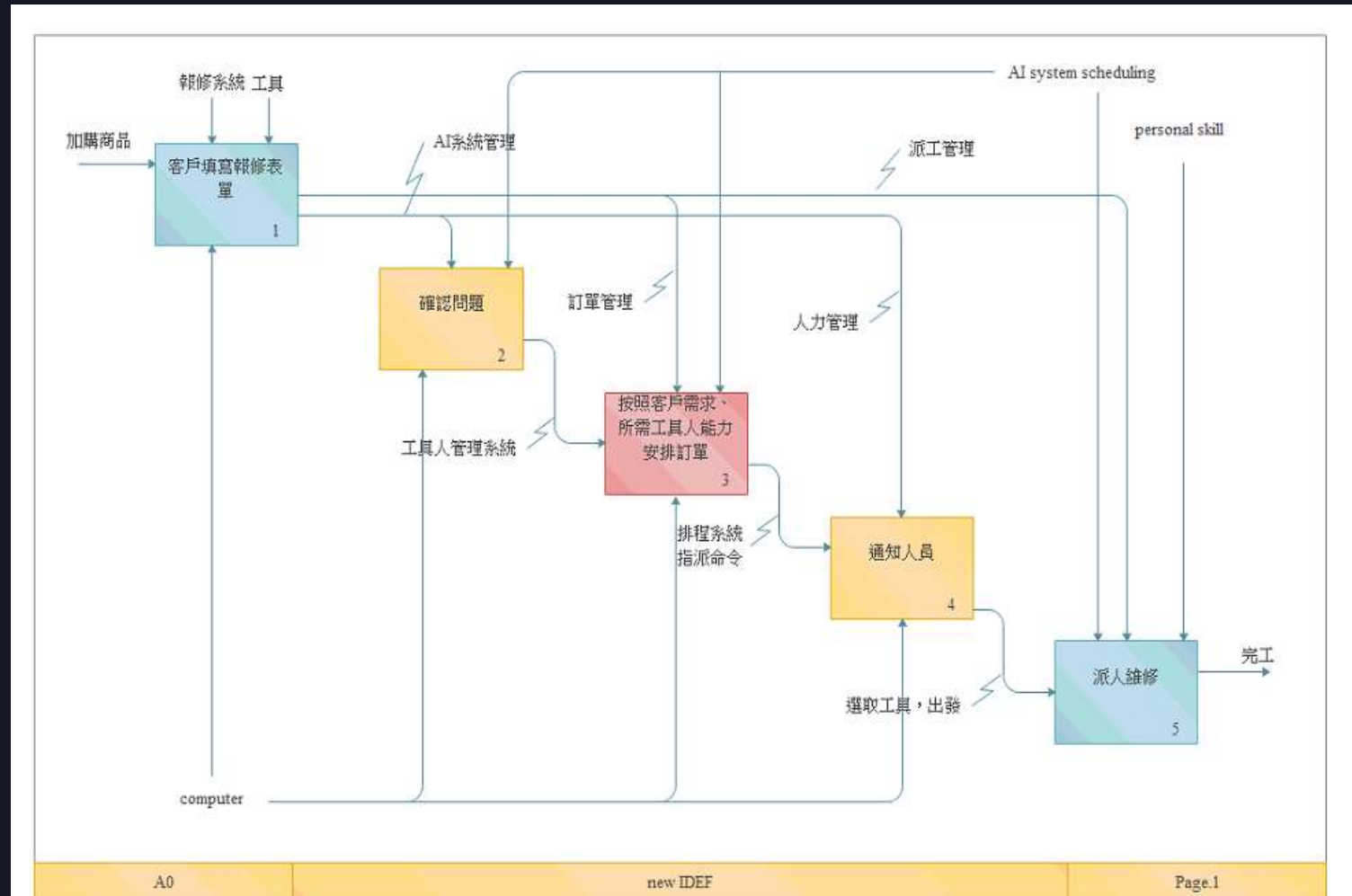
Page.2

IDEF-New process

New process

IDEF-A0

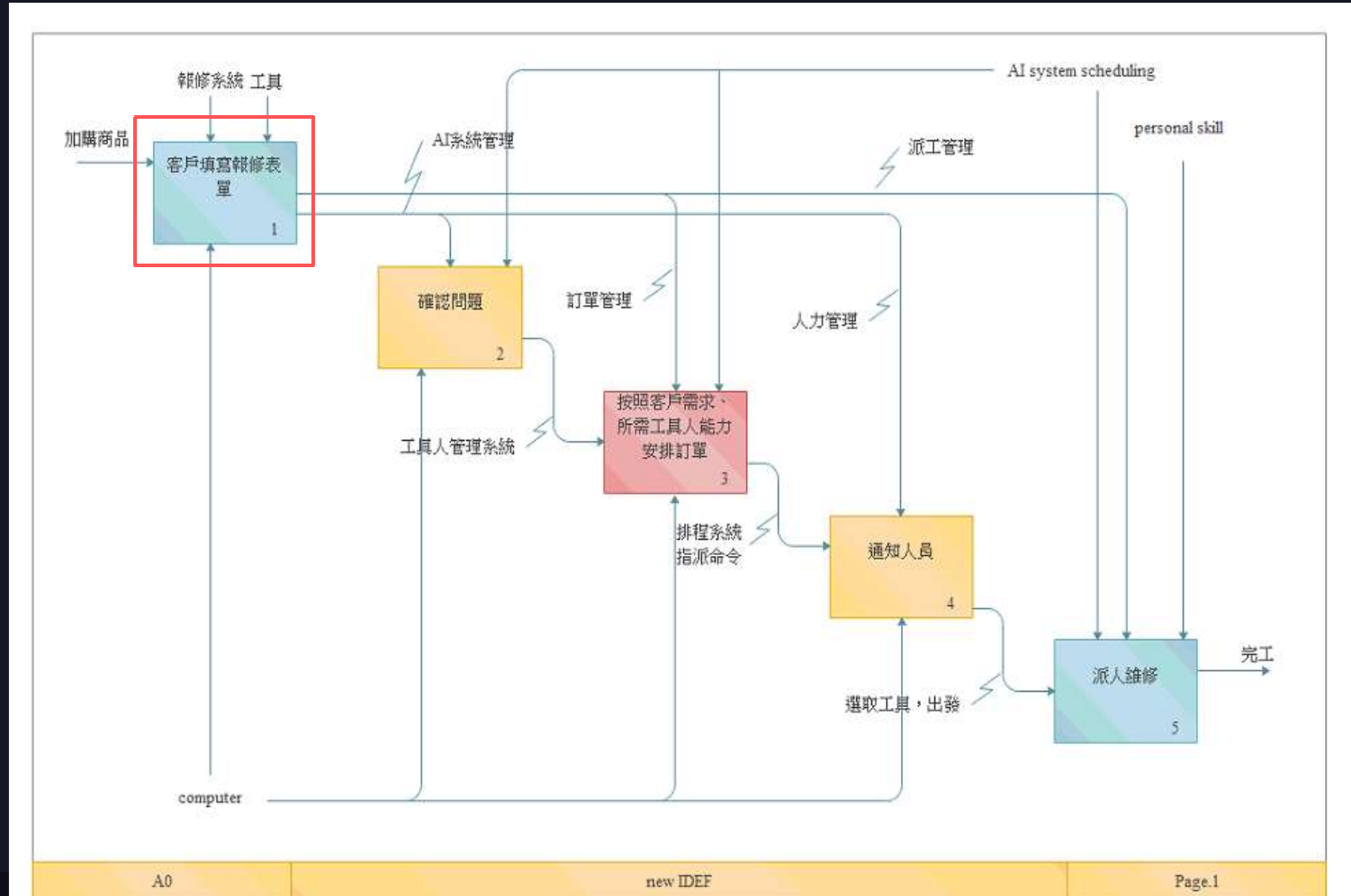
- Fill out the form
- Check the problem
- Problems classification
- Inform the tool man
- repair



New process

IDEF-A1

- Order
 - ✓ Log in
 - ✓ Fill out the form
 - ✓ Check the order



A0

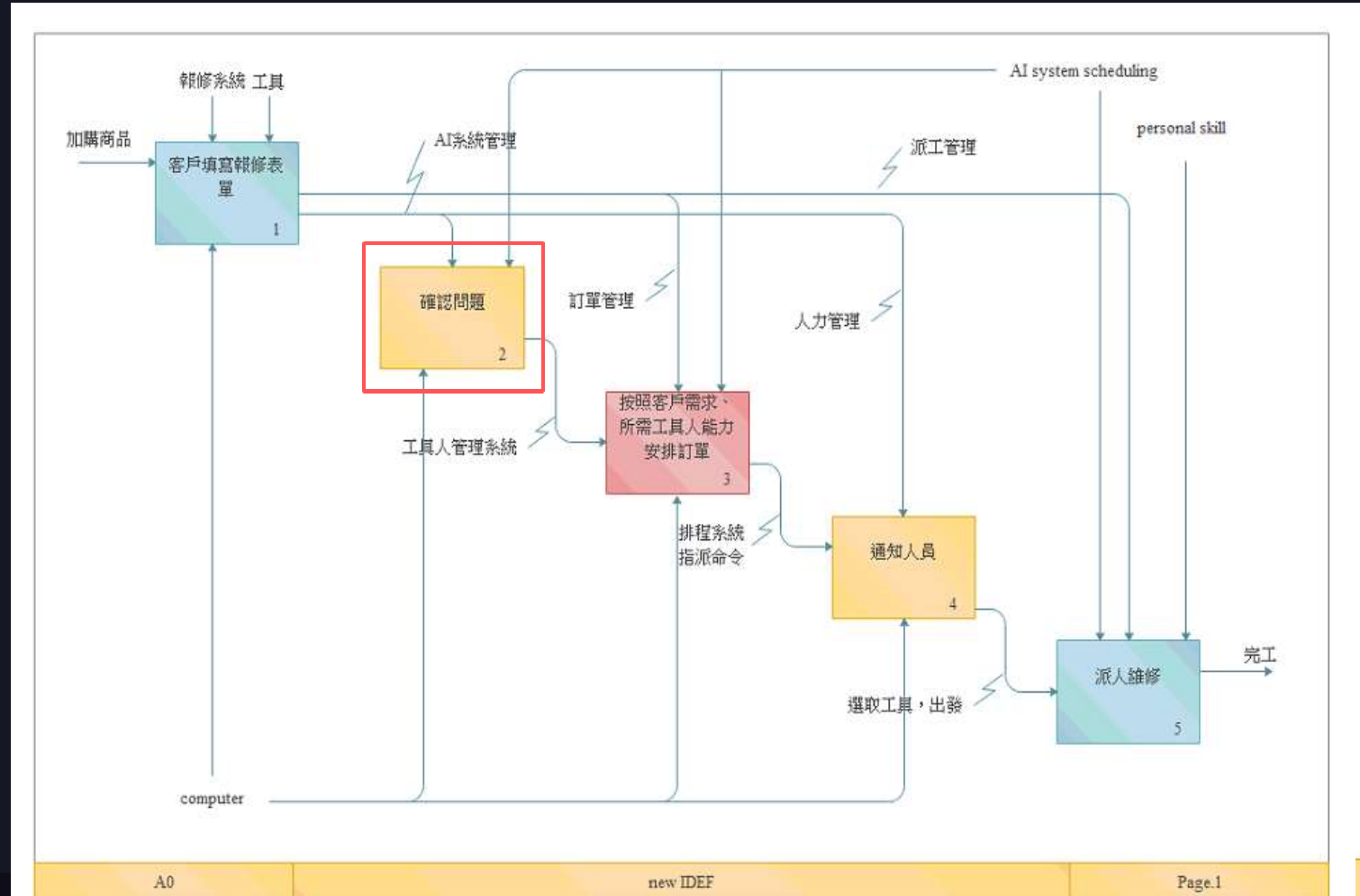
new IDEF

Page.1

New process

IDEF-A2

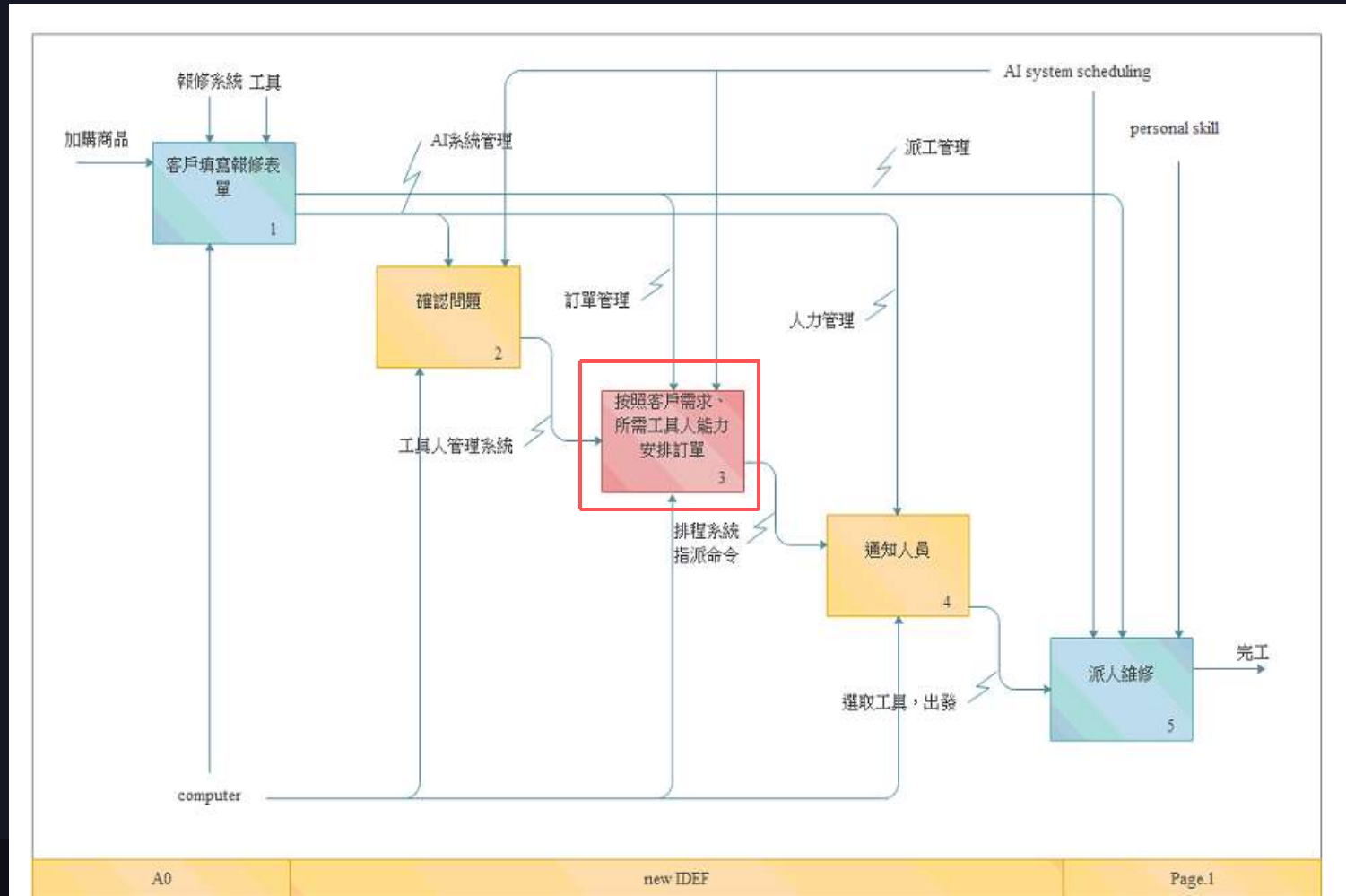
- Problem checking
 - ✓ Receive the order
 - ✓ Enter AI system
 - ✓ Keyword search
 - ✓ Classify problems



New process

IDEF-A3

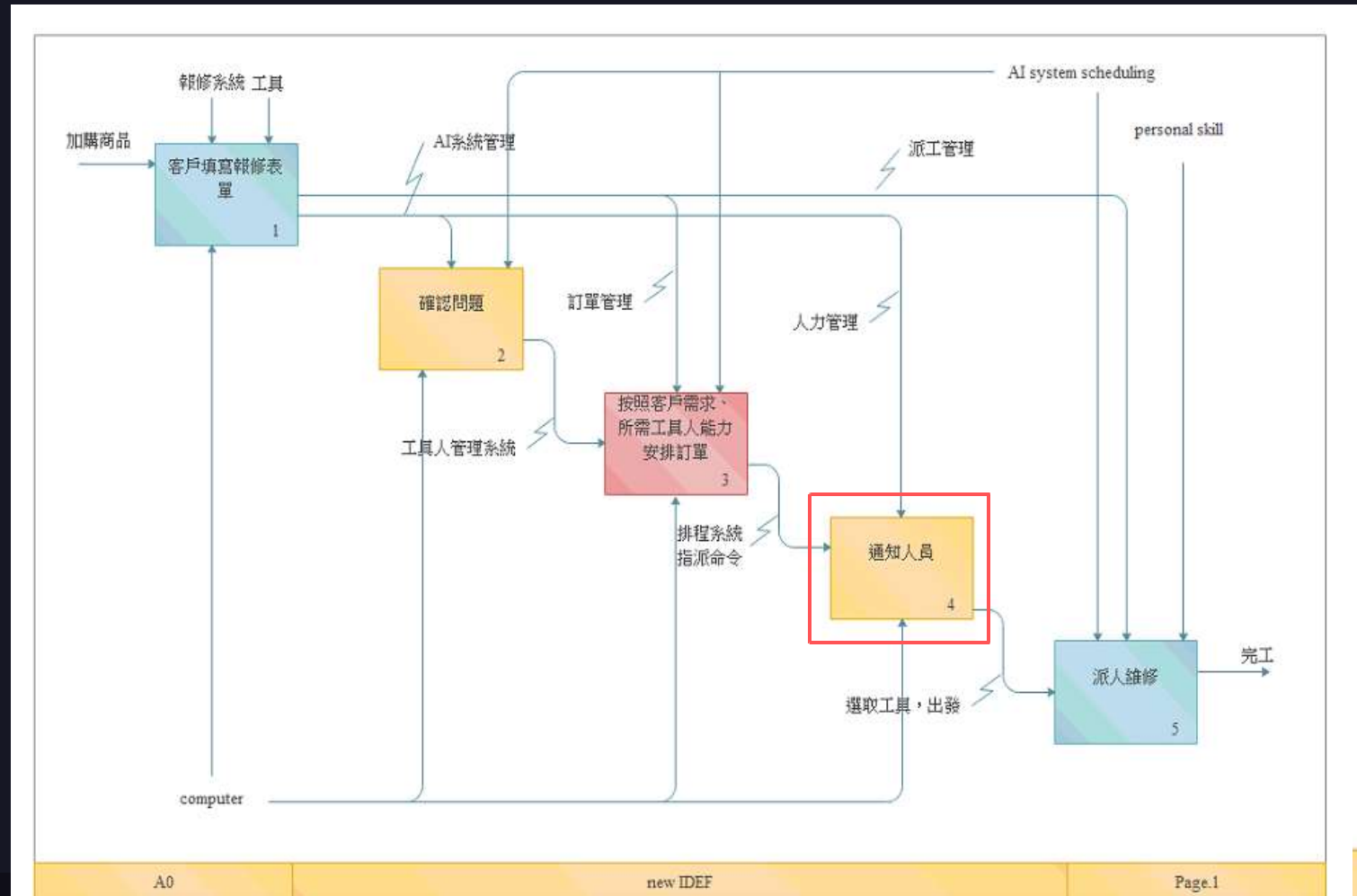
- Orders scheduling
 - ✓ Receive the classified orders
 - ✓ Check tool man's schedule
 - ✓ Match



New process

IDEF-A4

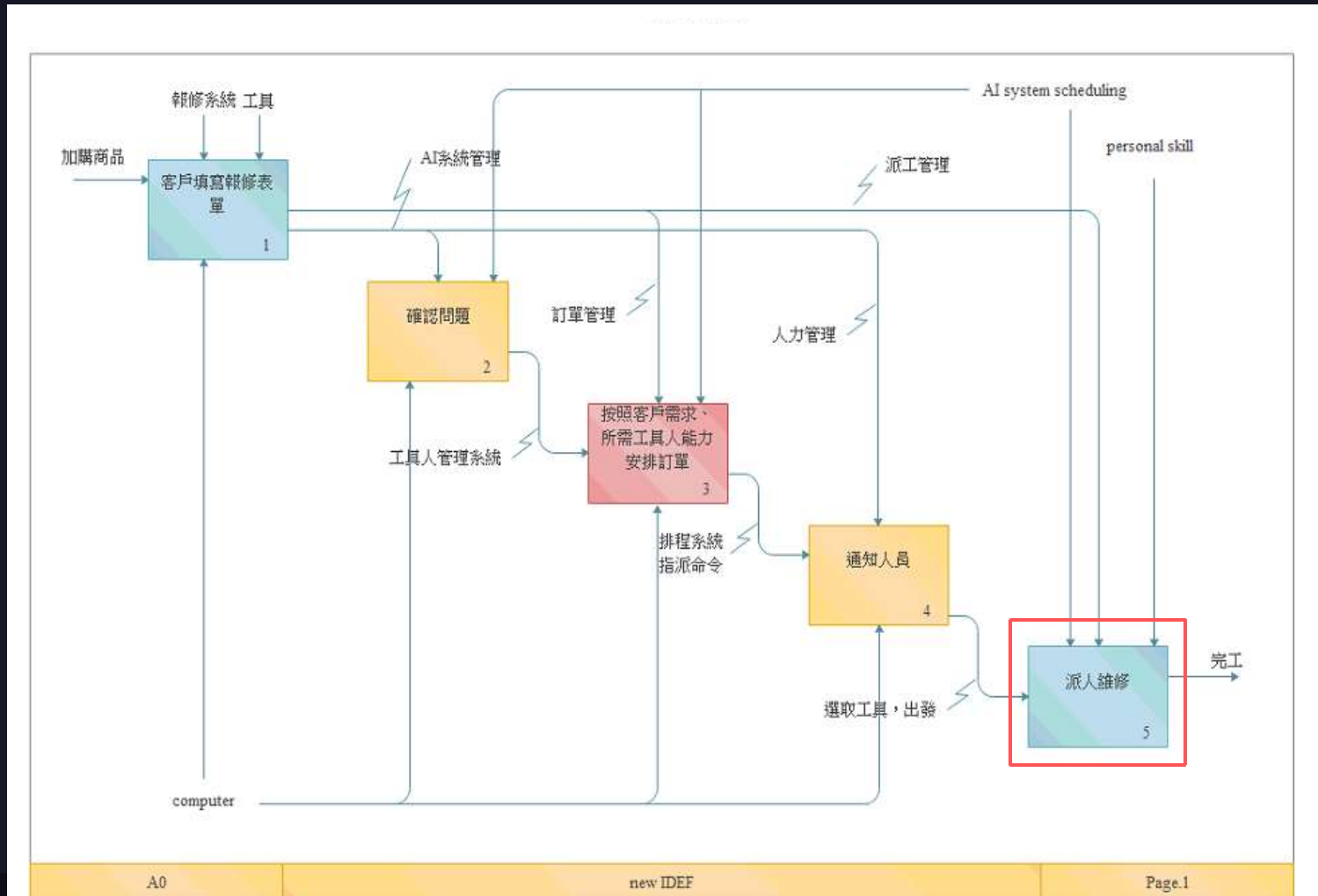
- Orders scheduling
 - ✓ Receive the job
 - ✓ Prepare the tools and components
 - ✓ Choose the vehicle and go



New process

IDEF-A5

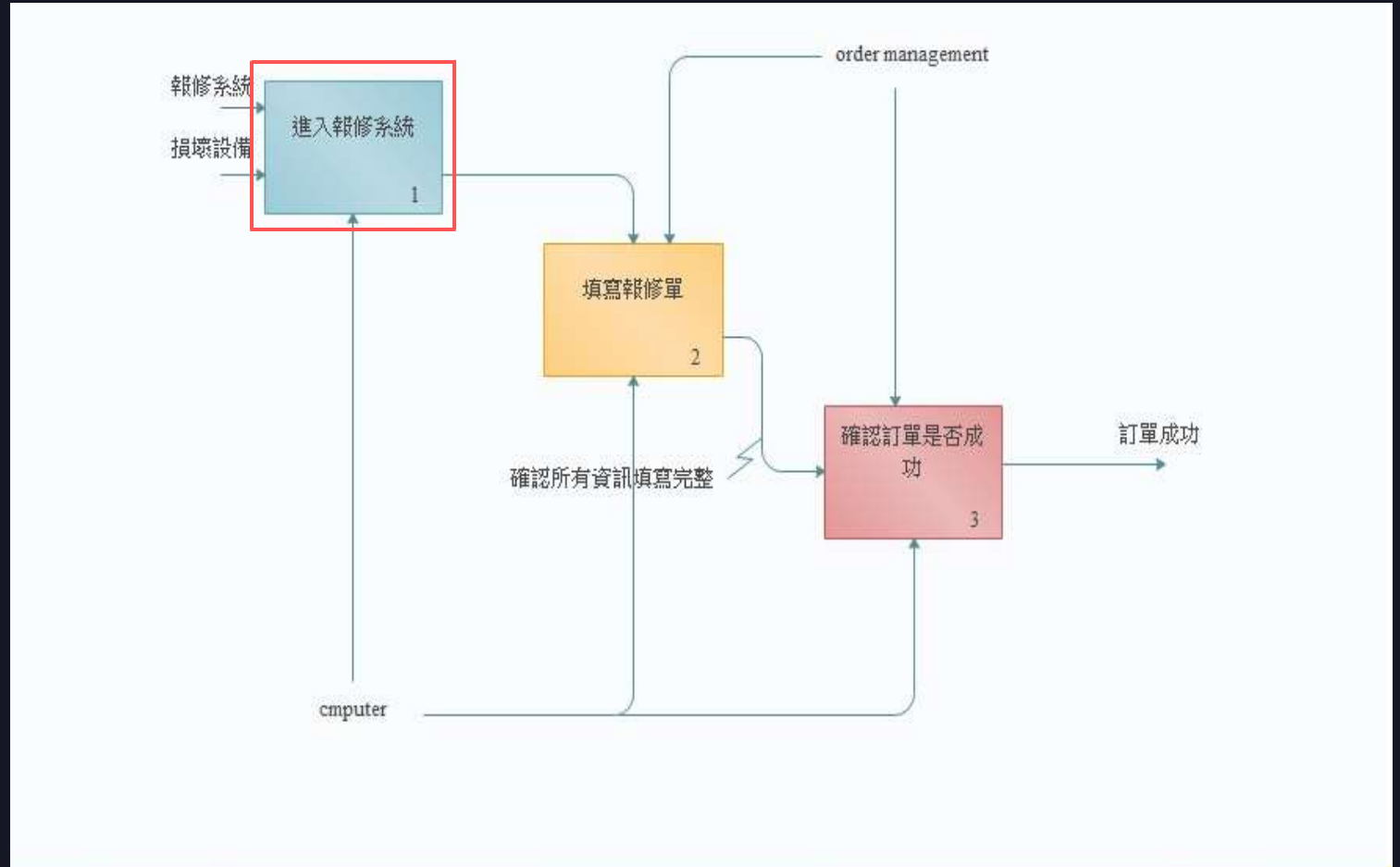
- Fixing
 - ✓ Reach
 - ✓ Check the problem
 - ✓ Maintenance
 - ✓ Inform the customer



New process

IDEF-A11

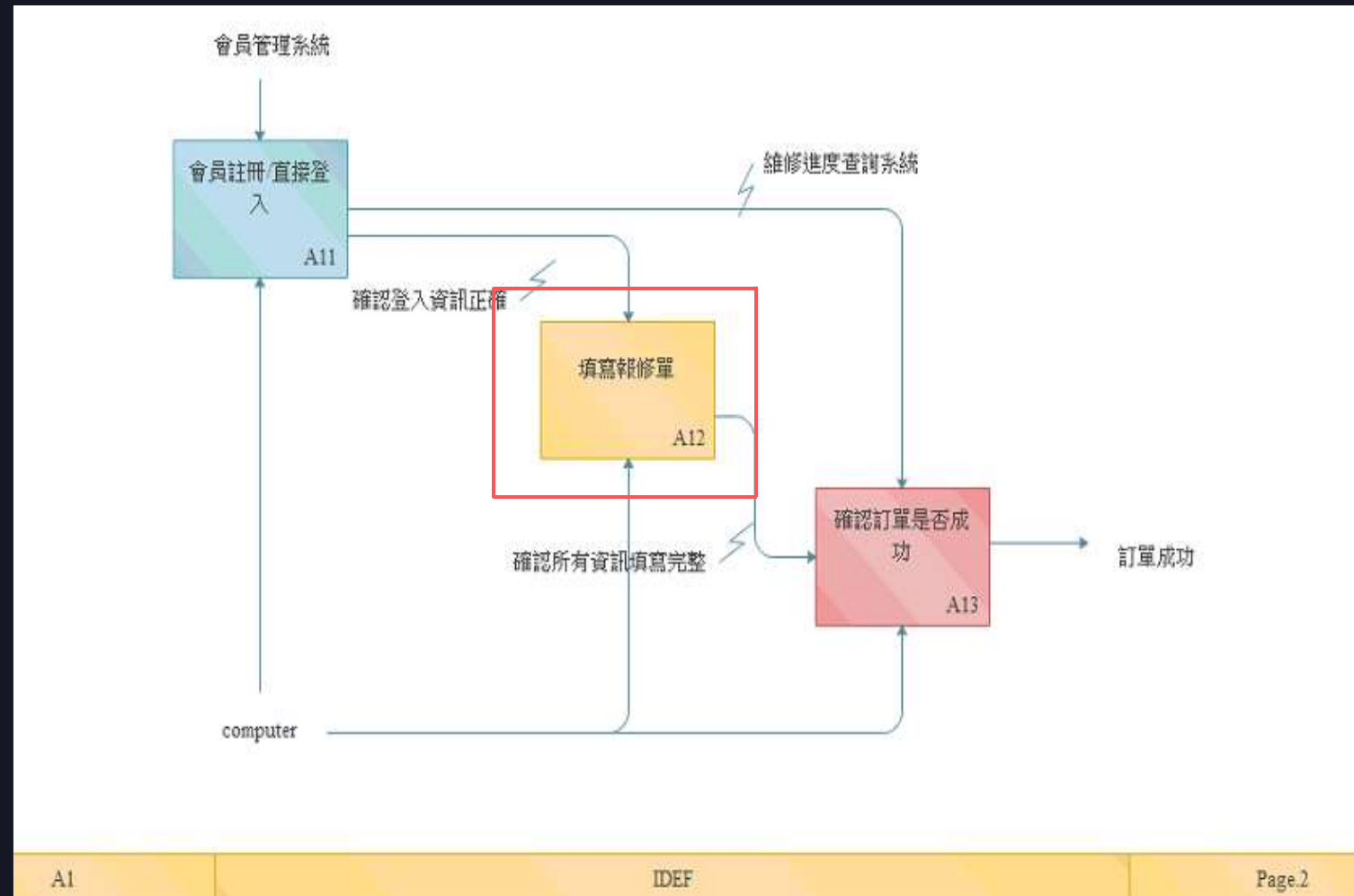
- Member login / register
 - ✓ Enter
 - ✓ Register
 - ✓ Login



New process

IDEF-A12

- Fill out the form
 - ✓ Dormitory
 - ✓ Room
 - ✓ Student ID
 - ✓ Name
 - ✓ E-mail
 - ✓ Maintenance category
 - ✓ Tool man
 - ✓ Problem description
 - ✓ Upload photos/videos

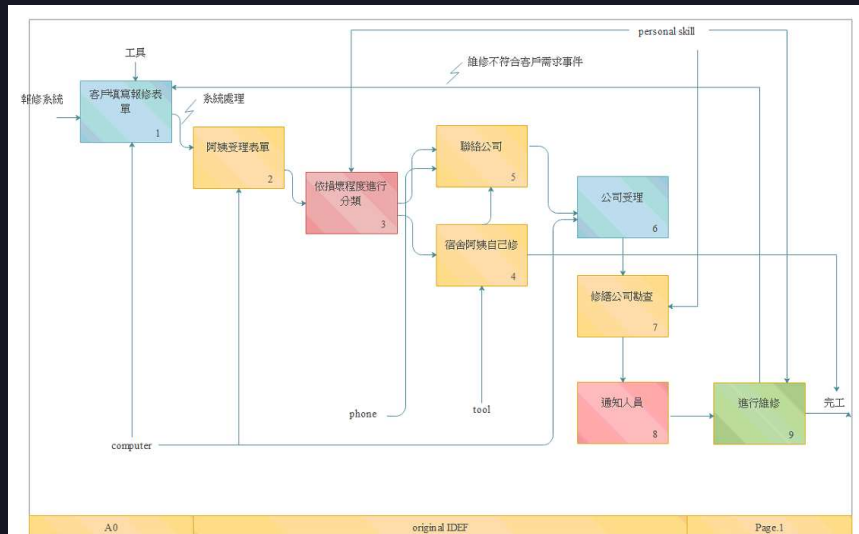


A1

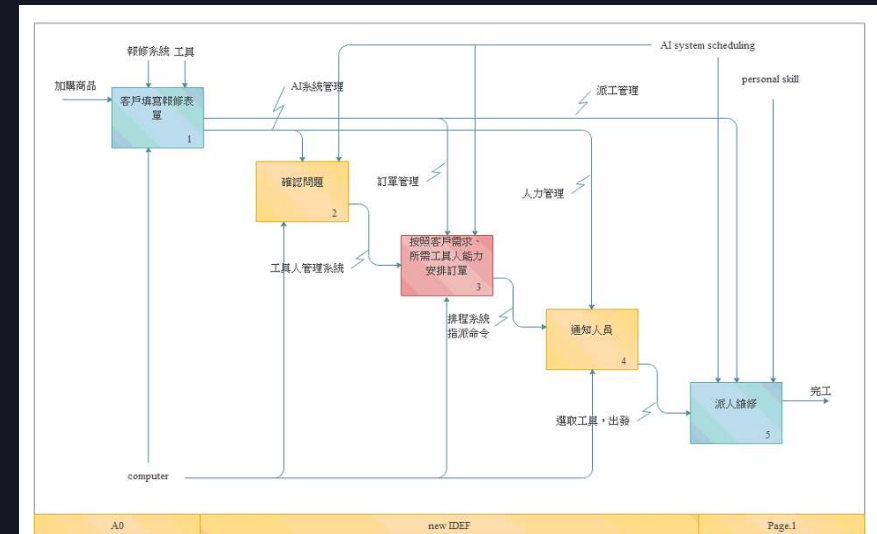
IDEF

Page.2

Process Comparison

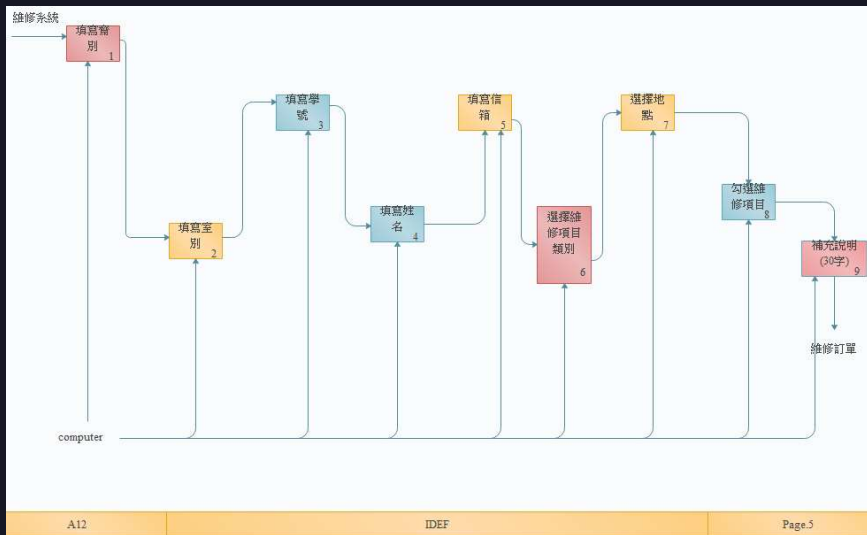


- Supervisors aren't on duty 24 hours
- No judging criteria

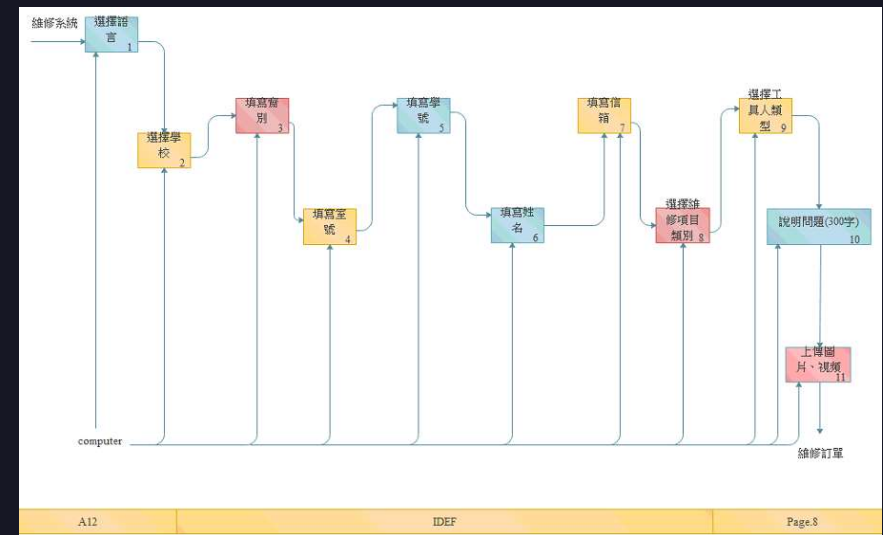


- Order management receive the orders directly
- AI system classify the problems and the matched tool man

Form Comparison



- Description is too vague
- Word limit of Supplementary explanation is only 30
- No pictures/ photos



- Add brief comments
- Word limit up to 300
- Upload videos/photos

Improvement Reults

FlexSim Simulation Comparison & Web Design and App Transformation

1

Flexsim Simulation
Comparison

2

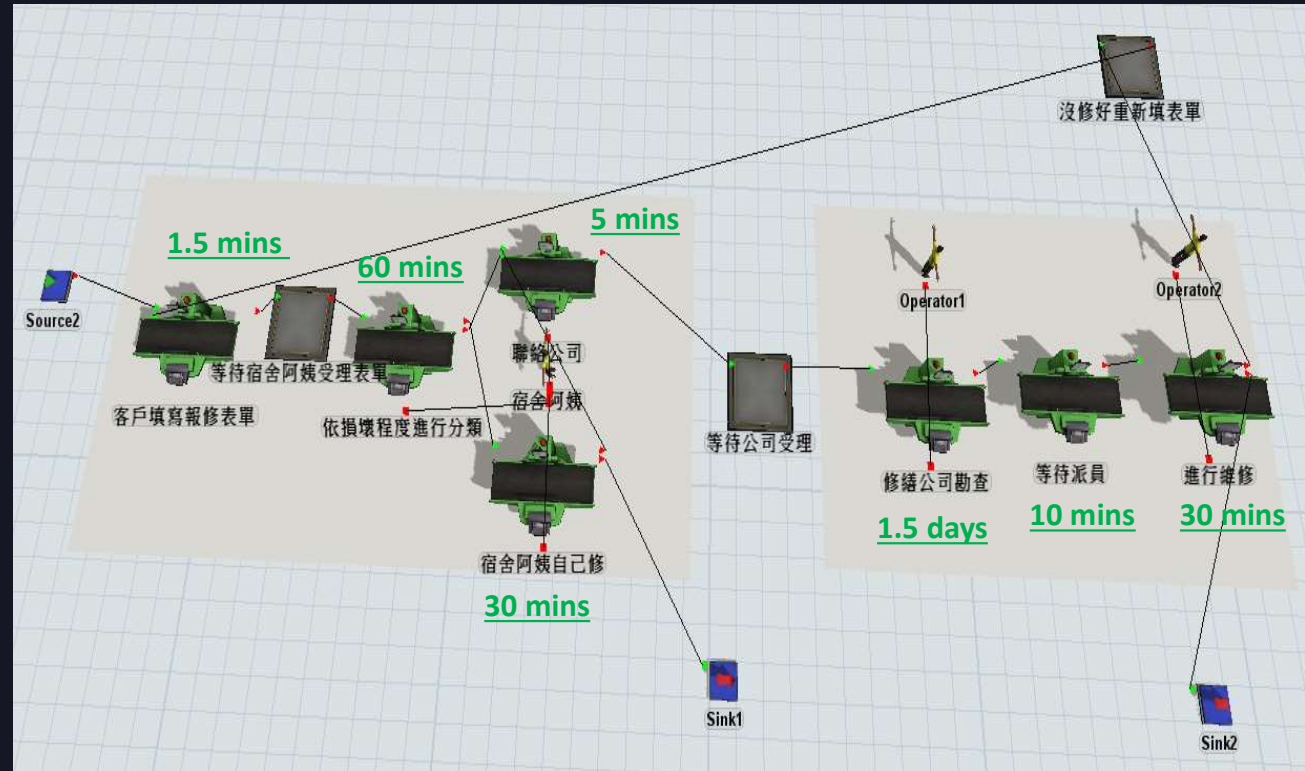
Web Design and
App Transformation

Original Process

模擬次數：20次

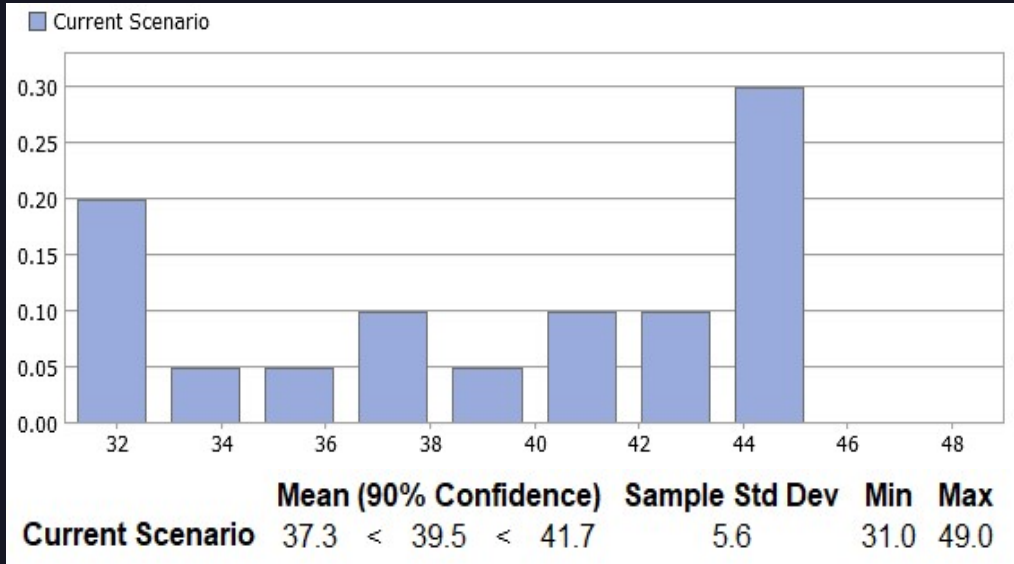
模擬時間：10800分鐘（七天）

Source：常態分配 平均數100 變異數10



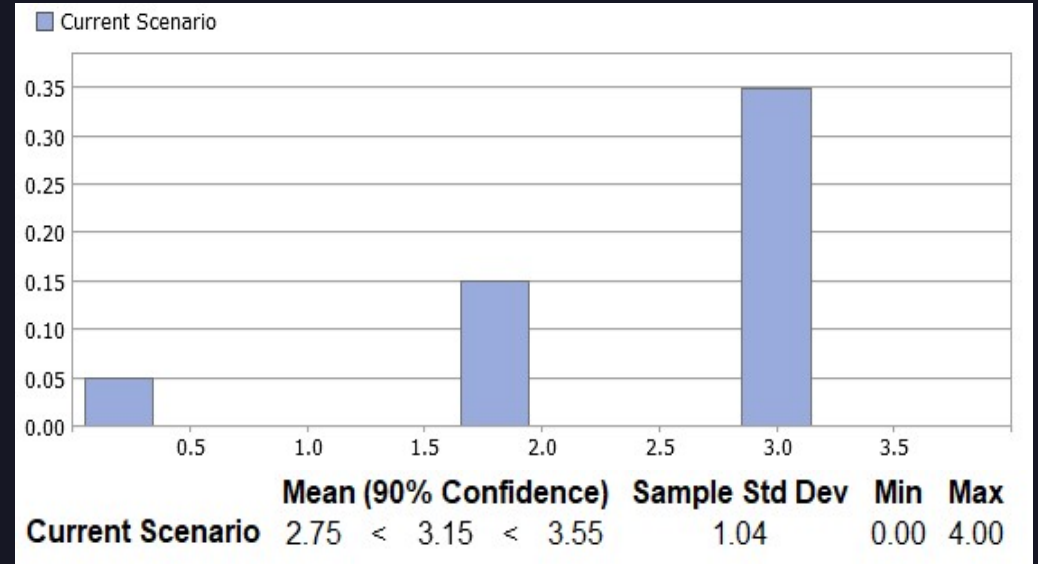
Experiment control

Cycle time



Sink1 Output

39.5



Sink2 Output

3.15

```
Sink1 - On Entry
1 /**Custom Code*/
2 Object current = ownerobject(c);
3 Object item = param(1);
4 int port = param(2);
5 double cycletime;
6 cycletime=time()-getlabel(item,"start");
7 settablenum("GlobalTable2",1,1,cycletime);
```

Sink1 Cycle Time

94.77m=1.5hr

```
Sink2 - On Entry
1 /**Custom Code*/
2 Object current = ownerobject(c);
3 Object item = param(1);
4 int port = param(2);
5 double cycletime;
6 cycletime=time()-getlabel(item,"start");
7 settablenum("GlobalTable1",1,1,cycletime);
```

Sink2 Cycle Time

8437.88m=5-6days

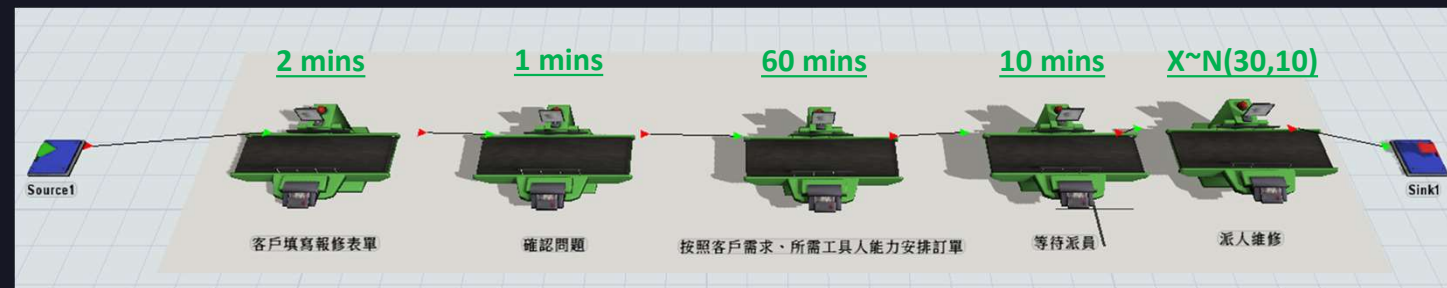
New Process

模擬次數：20次

模擬時間：10800分鐘（七天）

Source：常態分配 平均數100

變異數10

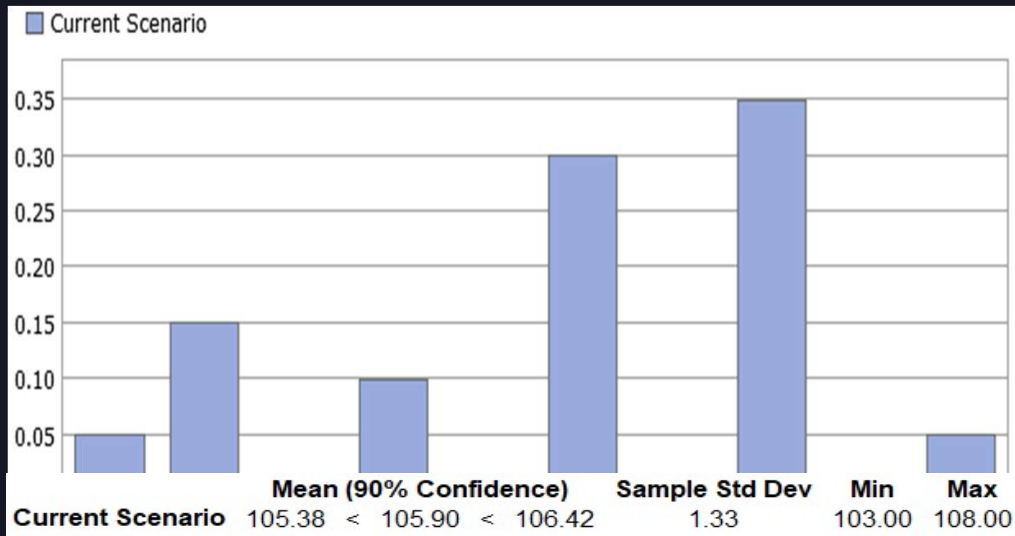


Experiment control

Cycle time



Repair Service Process
Improvement for TCYC



Output

105.9

```

1 /**Custom Code*/
2 Object current = ownerobject(c);
3 Object item = param(1);
4 int port = param(2);
5 double cycletime;
6 cycletime=time()-getlabel(item,"start");
7 settablenum("GlobalTable1",1,1,cycletime);

```

Cycle Time

129.93

Simulation Results Summary

	Original Process	New Process
Output	$39.5+3.15=42.65$	105.9
Cycle time(min)	$94.77+8437.88=8532.65(=5-6\text{days})$	129.93

Improvement Results

1

FleXsim Simulation
Comparison

2

Web Design and
App Transformation

SUBTITLE TEXT

APP TOOL MAN





Summary

Repair System

Unfriendly
Opaque

Information

Slow flow

IDEF

ANALYSIS

Process

Complicated
Unbalanced

Person

Unprofessional
Rework

4

System

1

Process

3

Information

2

Person



Improvement

Simplified Process

Cut a process branch and centralized the repair order processing

frist

Professional worker

Short repair cycle
Avoid rework

second

Artificial Intelligence System

Replace the dormitory supervisors

third

Website and App

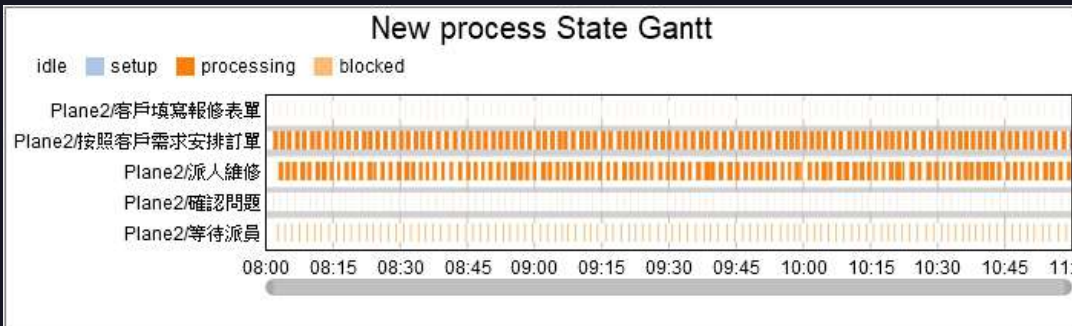
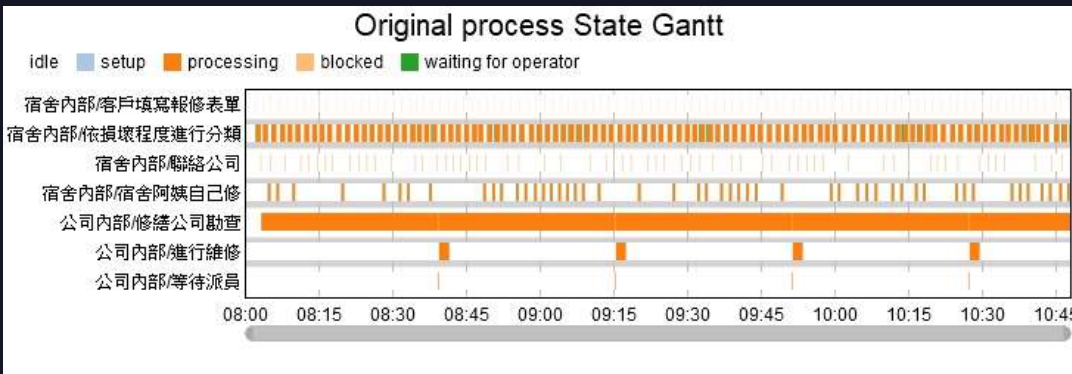
Simplify form
Add option description
Provide picture/video upload function...

fourth

SUBTITLE TEXT

Service Efficiency

Simulation experiments are executed in FlexSim and demonstrate that the ideal new repair process takes only 1.5% time of the original, which greatly improves the repair efficiency and customers satisfaction.



SUBTITLE TEXT

THANK YOU FOR LISTENING!

Welcome to visit our website:

http://140.114.54.94/iie_2019/group3/project1

