Group Assignment
This is an assignment of a group of 3 - 4 members.

Part A: **(40 marks)**
You are involving in evaluating a newly proposed smart system. The system is supposed to work with different types of home appliances so that user can management and control the appliances remotely via an application in a smart phone or smart watch or local control panel, which can be a touch screen or voice control panel. The system is also designed to connect and work with vehicles so that user can monitor and control certain features in the vehicle if necessary.

Discuss your concerns on the proposed system from the following perspectives:
a) Reliability.
b) Security.
c) Compatibility.
d) Maintainability (e.g. troubleshoot, update and upgrade).

Part B: Threads and synchronisation **(60 marks)**
A chair is made up of three parts, the body, the arms and the legs. Each part is manufactured separately. Assembler needs to wait for all the three parts to be ready before it can start to assemble a chair. When 6 chairs have been completed, the packager will take all the chairs for packaging. The operations can be simulated with a multithreaded program.

a) Write the algorithm for the multithreaded program to simulate the operations.

b) Write a multithreaded program to simulate the operations of based on the following guidelines:

- Each task is done by a thread, i.e. crafting arm, crafting leg, crafting body, assemble the chair and pack the chairs.
- All the parts and completed chairs will be placed in respective queue. If a queue is full, the corresponding thread has to wait for assembler to remove one from the queue.
- In each thread, print message to screen to indicate that it is waiting for signal or it is operating. For example,

```
ArmTask: crafting…
LegTask: crafting…
BodyTask: crafting…
AssemblerTask: waiting…
Packager: waiting…
ArmTask: crafting…
BodyTask: crafting…
LegTask: waiting…
AssemblerTask: assembling…
Packager: packaging…
…
```

- The program should be properly commented.

Items to be submitted (SOFTCOPY ONLY, hardcopy is not required):

1. A documentation that contains
   - **Part A.**
   - **Part B**
     - **The algorithm**
     - **Screenshot of the program output**

2. Project folder of the program.

Save all the above items in a folder with your name as the folder name and zip it.

Submission method / link will be announced later.