SFDV3006 Concurrent Programming

Lab 7 – Additional Exercises on Concurrent Architectures (theory)

Q1. You need to develop a system where many users want to be informed about weather in some cities of their choice about when it becomes very hot or cold or is raining. Which concurrent architecture can be used? Explain why and draw a diagram for it. Explain what each component will do in your solution.

Q2. You need to write a program to convert a GIF file into a PNG file. Which architecture would you use? Draw a diagram for the selected architecture.

Q3. You need to develop a system to convert thousands of very large PDF files into Word documents. Which concurrent architectures would you need to use and why?

Q4. You need to develop a system for a mobile phone company which informs the users when their balance is below a particular level. Which architecture would you use? Explain why.

Q5. A system needs to be developed for an airport which can let subscribing users know (by SMS for example) when a particular flight has landed at the airport. Which architecture can be used? Explain why.

Q6. You need to develop a foreign currency monitoring system which lets users know when a particular currency (such as US Dollar) is above or below some level. Which architecture can be used? Explain why.

Q7. A very large website with hundreds of thousands of web pages (like Wikipedia) needs to be downloaded with each web page as a PDF file. Which architectures can be used to solve this problem?

Q8. Users of a particular website want to be notified when some page on the website is changed by the owner of the website. Which architecture can be used? Explain why.

Q9. You are asked to develop a system in which owners register their websites and the system notifies them by (email or SMS) when their website is down or not reachable. Which architecture can be used? Explain why.

Q10. Correct the mistakes in the following algorithm for the Supervisor-Worker architecture

Supervisor:

```
forall tasks do out("task",…) end
forall results: in("result",…) end
out("result")
```

Worker:

```
while not rdp("task") do
       in("task",…)
       compute result
       out("task",…)
end
```

Q11. Which two architectures need at least two or more computers? Explain why.

Q12. Which concurrent architecture needs a network? Explain why.