University of York

Embedded Systems Design & Implementation

Open Individual Assessment

# Open Assessment 1

*Examination number:*

Y3606797

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# 1 Part 1 - Theory

## 1.1 Question 1

We can determine the rate X of actor H by producing a set of simultaneous equations from Table 1 and the provided Synchronous Dataflow model.

The topology matrix for the SDF model is as follows:

$$\Gamma = \begin{bmatrix} 2 & 0 & 0 & 0 & -2 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & -2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & -2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & -2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2 & -6 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & -1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 3 & -2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & X & -3 \\ 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 \end{bmatrix}$$

This gives us the following simultaneous equations:

$$\begin{array}{llll} 2A - 2E = 0 & 2B - 2E = 0 & 2C - 2E = 0 & 2D - 2E = 0 \\ 2E - 6F = 0 & F - I = 0 & 3G - 2H = 0 & XH - 3I = 0 \\ I - G = 0 & & & \end{array}$$

Using these equations I determined that $X = 2$. Similarly, I determined the firing frequencies of the remaining actors.

$$q = \begin{matrix} A \\ B \\ C \\ D \\ E \\ F \\ G \\ H \\ I \end{matrix} \begin{pmatrix} 6 \\ 6 \\ 6 \\ 6 \\ 6 \\ 2 \\ 2 \\ 3 \\ 2 \end{pmatrix}$$

### 1.2 Question 2

### 1.3 Question 3

## 2 Part 2 - WSN MAC layer protocol

### 2.1 Question 1

### 2.2 Question 2

## 3 Part 3 - Embedded platform modelling

### 3.1 Question 1