

Course “System Analysis and Modelling”

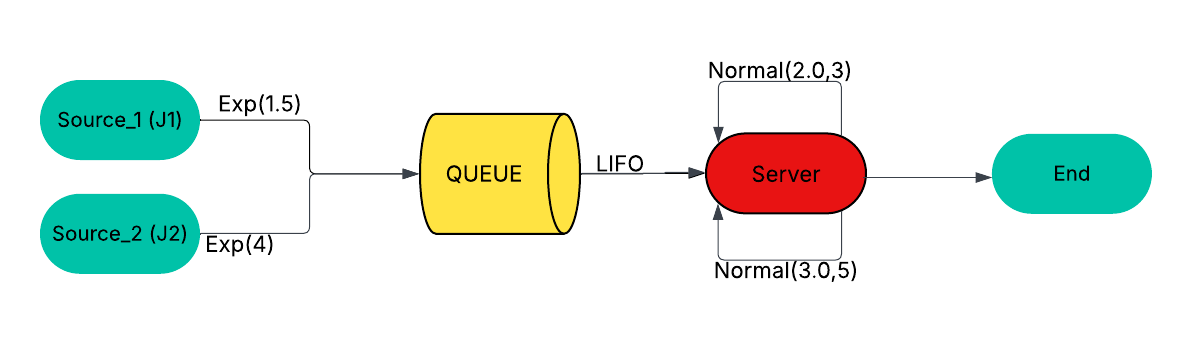
Practical Assignment 1

TSI spring 2025

**Table of Contents**

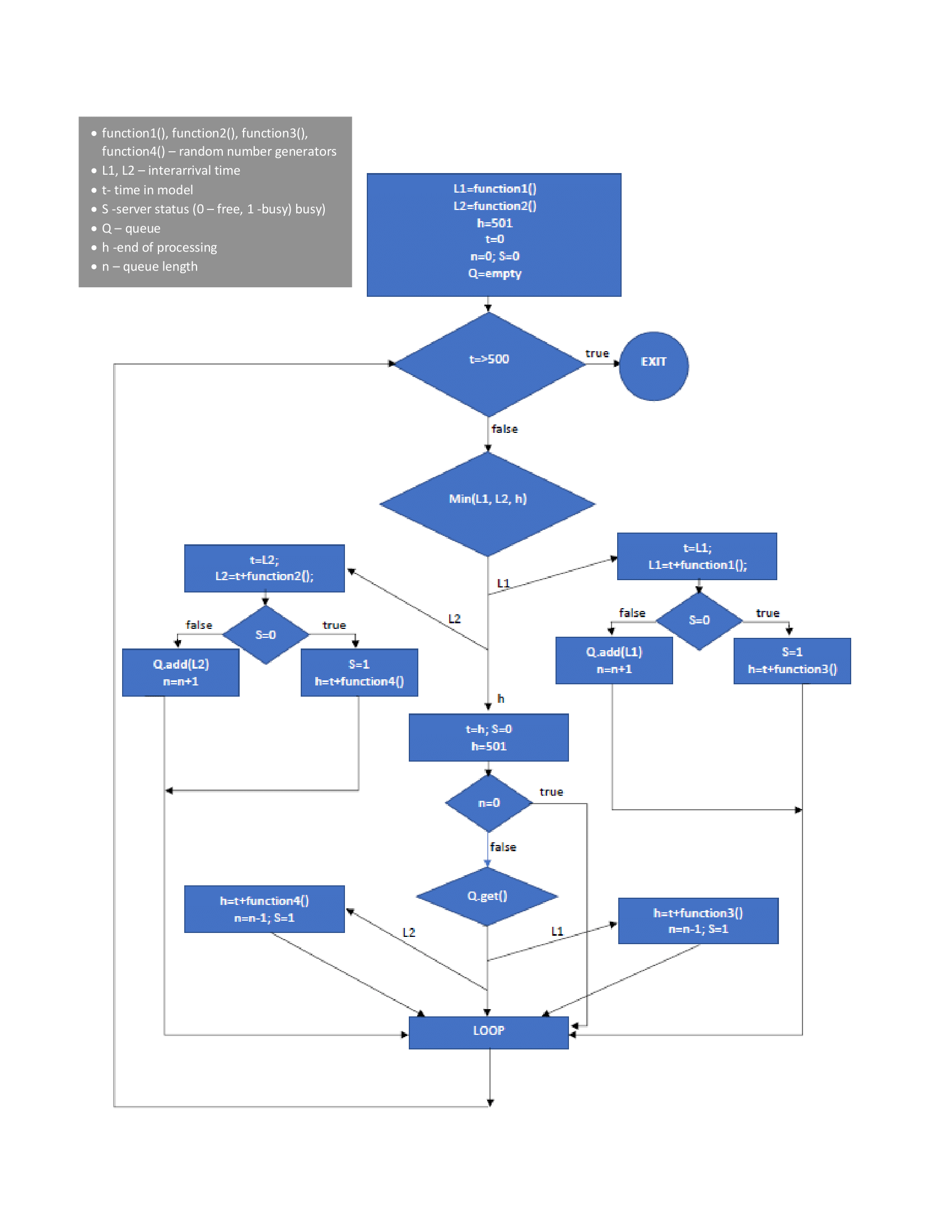
1. **Description of the System and Conceptual Model**

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1. **Description of Model1 Development (main functionality)**
   1. **Flowchart algorithm of model**

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* 1. **Description of the model**

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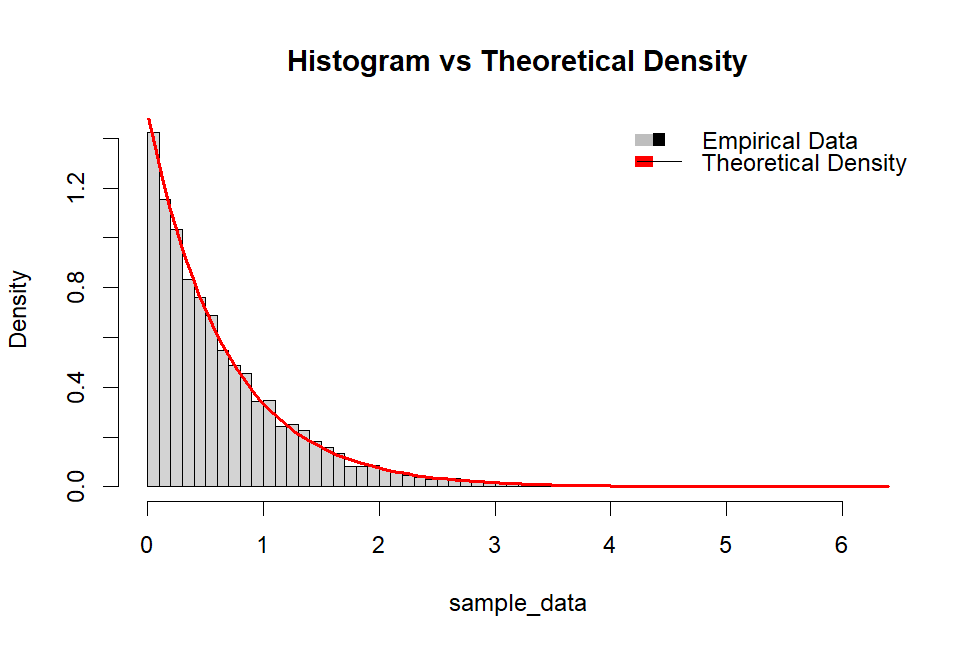
* 1. **Random number generator testing**

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Hupotheses: ▪ Kolmogorov-Smirnov test: + Null hypothesis: The sample follows an exponential distribution with a specific parameters. - Alternative: Sample distribution is significantly different from the expected distribution. \* Significance level: 5% or 0.05 ▪ Chi-square test: + Null hypothesis: There is no significant difference between the observed frequencies and the expected frequencies and sample follows a specified distribution with specific parameters. - Alternative: There is a significant difference between the observed frequencies and the expected frequencies. \* Significance level: 5% or 0.05

**Testing RNG with Exponential distribution (rate = 1.5)**

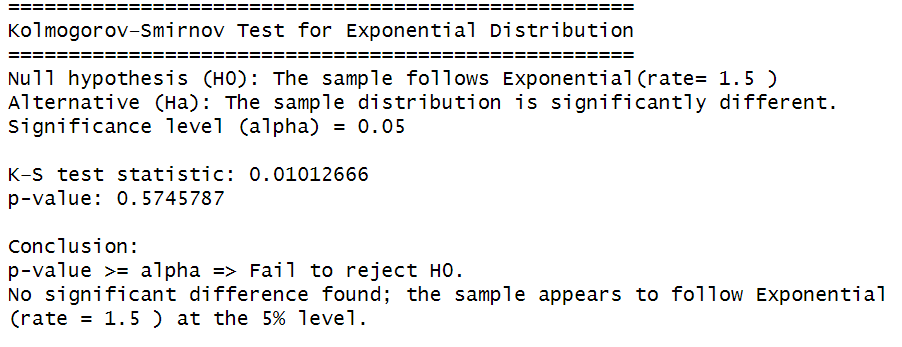
* **Histogram**

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Description of the histogram :

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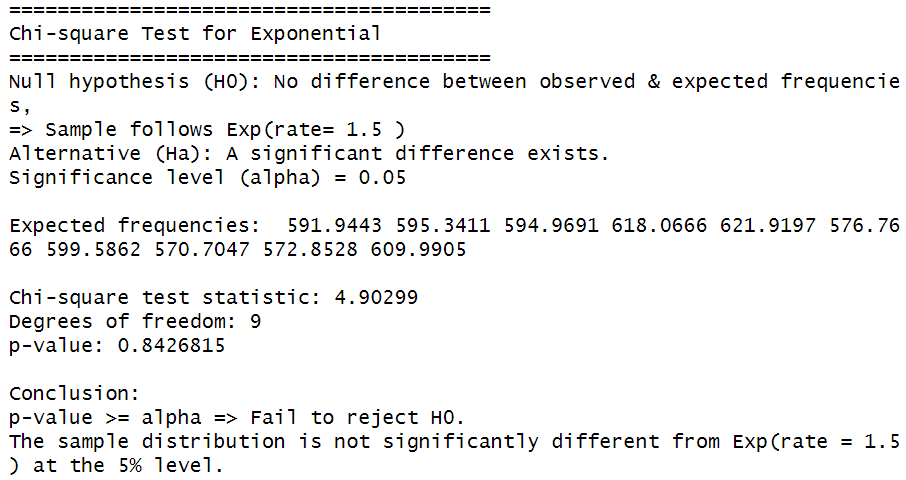
**• Kolmogorov-Smirnov test**

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**Description of K-S test:**

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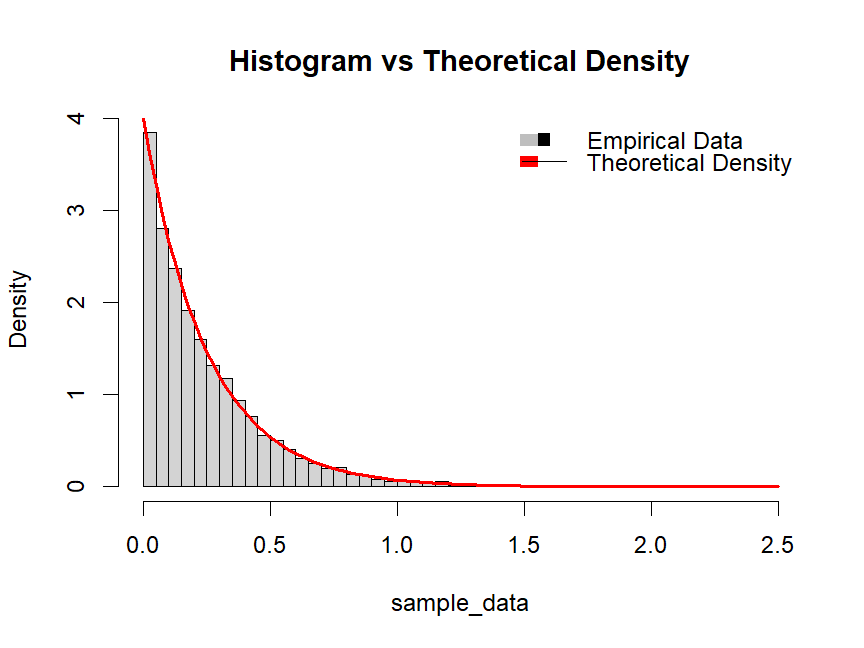
**• Chi-square test:**

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**Description of Chi-square test:**

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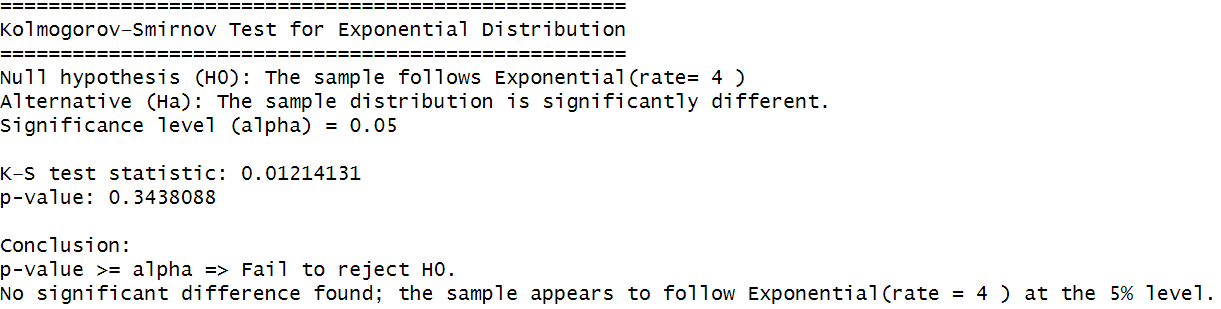
**Testing RNG with Exponential distribution (rate = 4)**

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**Description of Histogram:**

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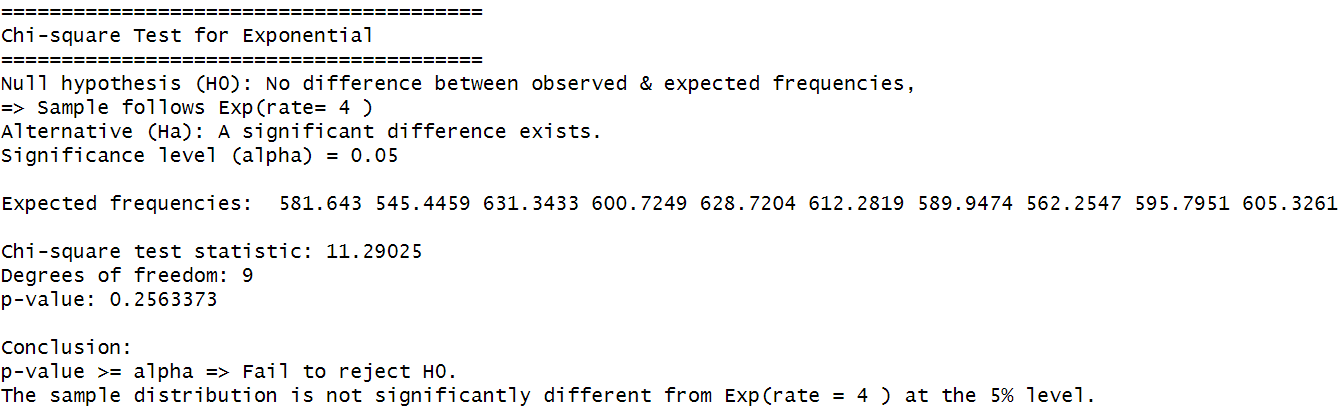
**• Kolmogorov-Smirnov test**



**Description of K-S test:**

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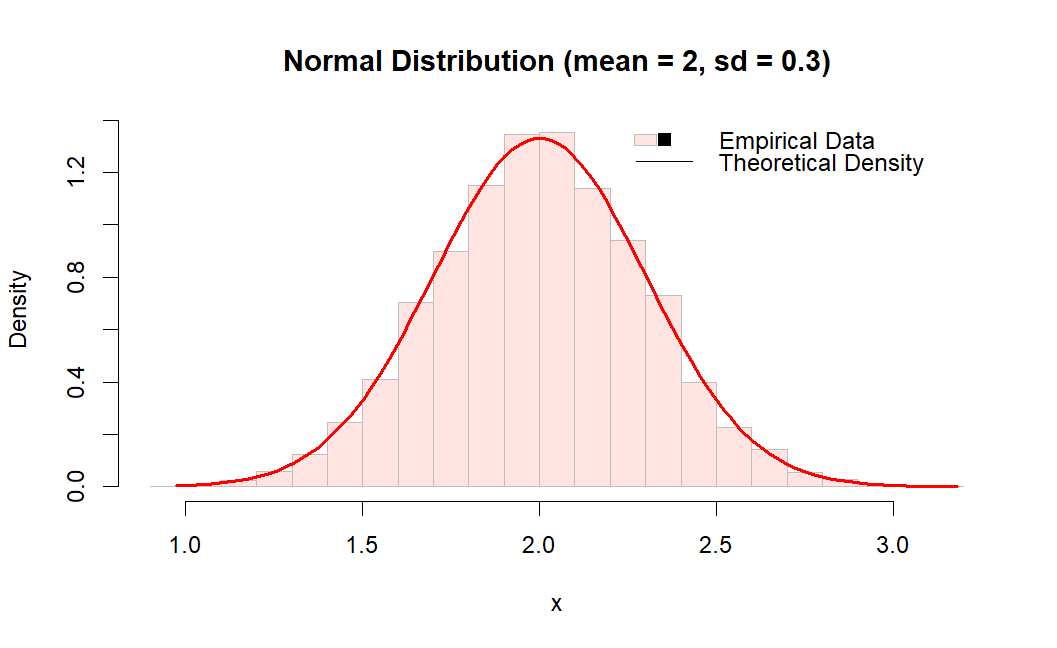
**• Chi-Square test**

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**Description of Chi-Square test**

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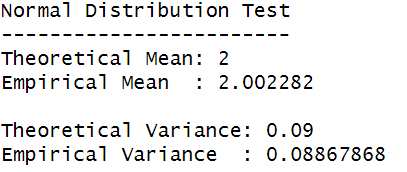
**Testing RNG with Normal distribution (mean = 2, standard deviation = 0.3)**

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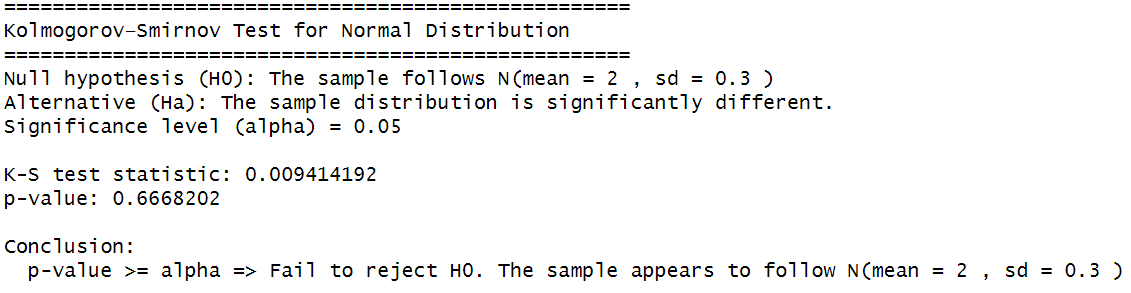
**Description of Histogram:**

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**• Testing distribution law parameters**

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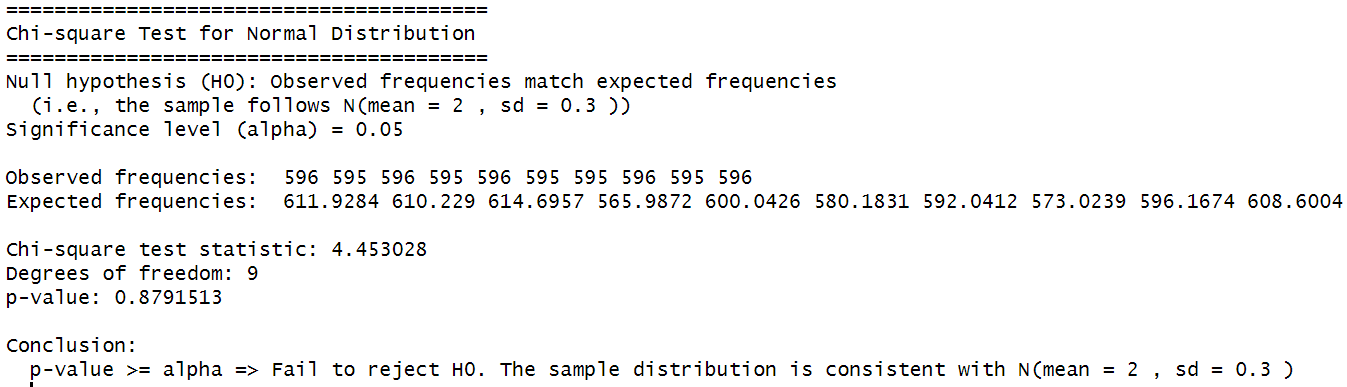
**• Kolmogorov-Smirnov test**



**Description of K-S test:**

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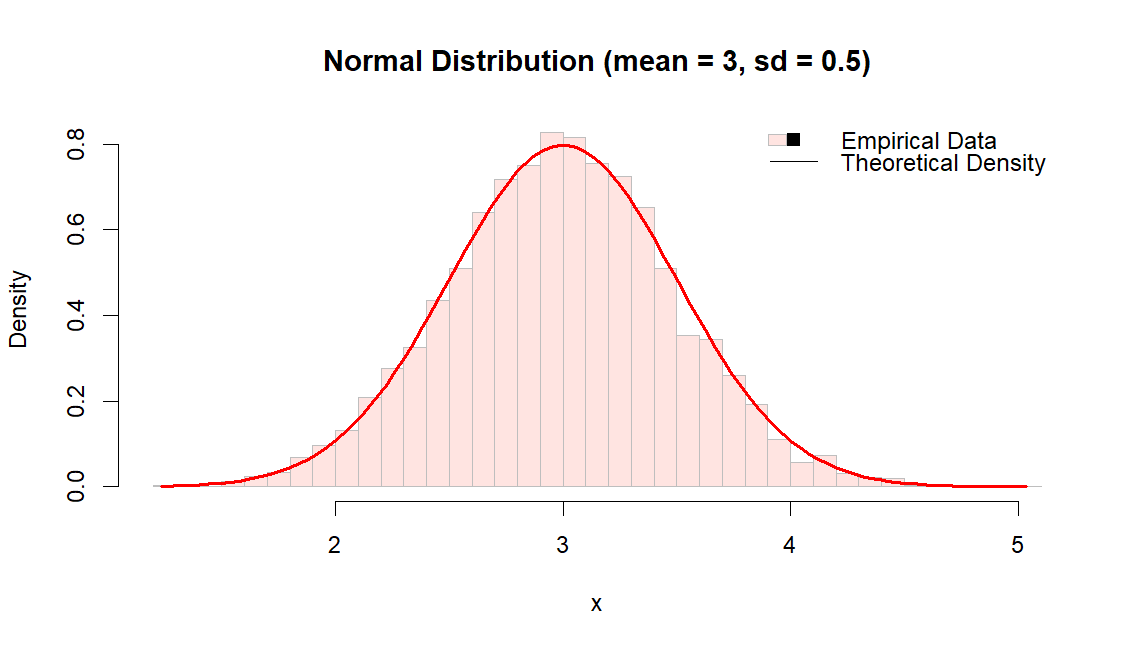
**• Chi-Square test**

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**Description of Chi-Square test**

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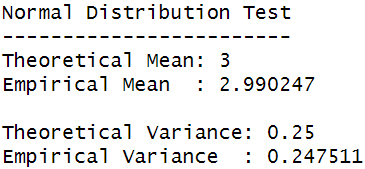
**Testing RNG with Normal distribution (mean = 3, standard deviation = 0.5)**

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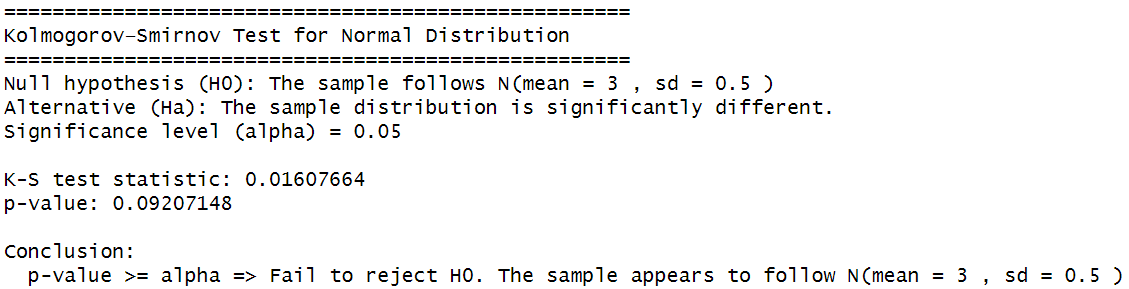
**Description of Histogram:**

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**• Testing distribution law parameters**

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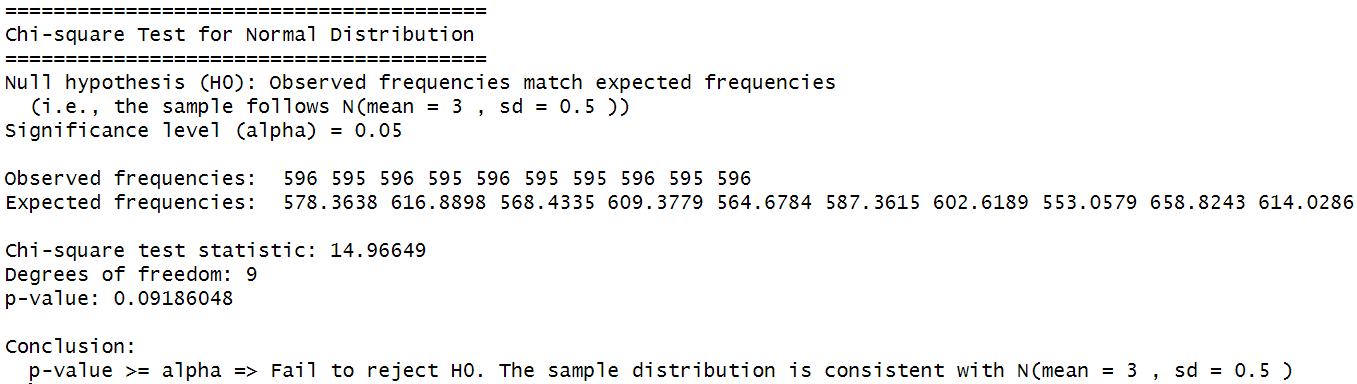
**• Kolmogorov-Smirnov test**



**Description of K-S test:**

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**• Chi-Square test**

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**Description of Chi-Square test**

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**Conclusion on test results**

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* 1. **Simulation results**

The simulation was run one time and successfully finished. Figure 3 reflects the output produced by the simulation program along with calculated measures of effectiveness. The first 20 events are reflected in the table below

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| # | Event | Time | J1 | J2 | Proc\_time | S | QUEUE | N |
| 0 | Start | 0 | 1.24 | 501 | 0 | 0 | [] | 0 |
| 1 | J2 arrival | 0 | 1.24 | 0.1 | 2.6793 | 1 | [] | 0 |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
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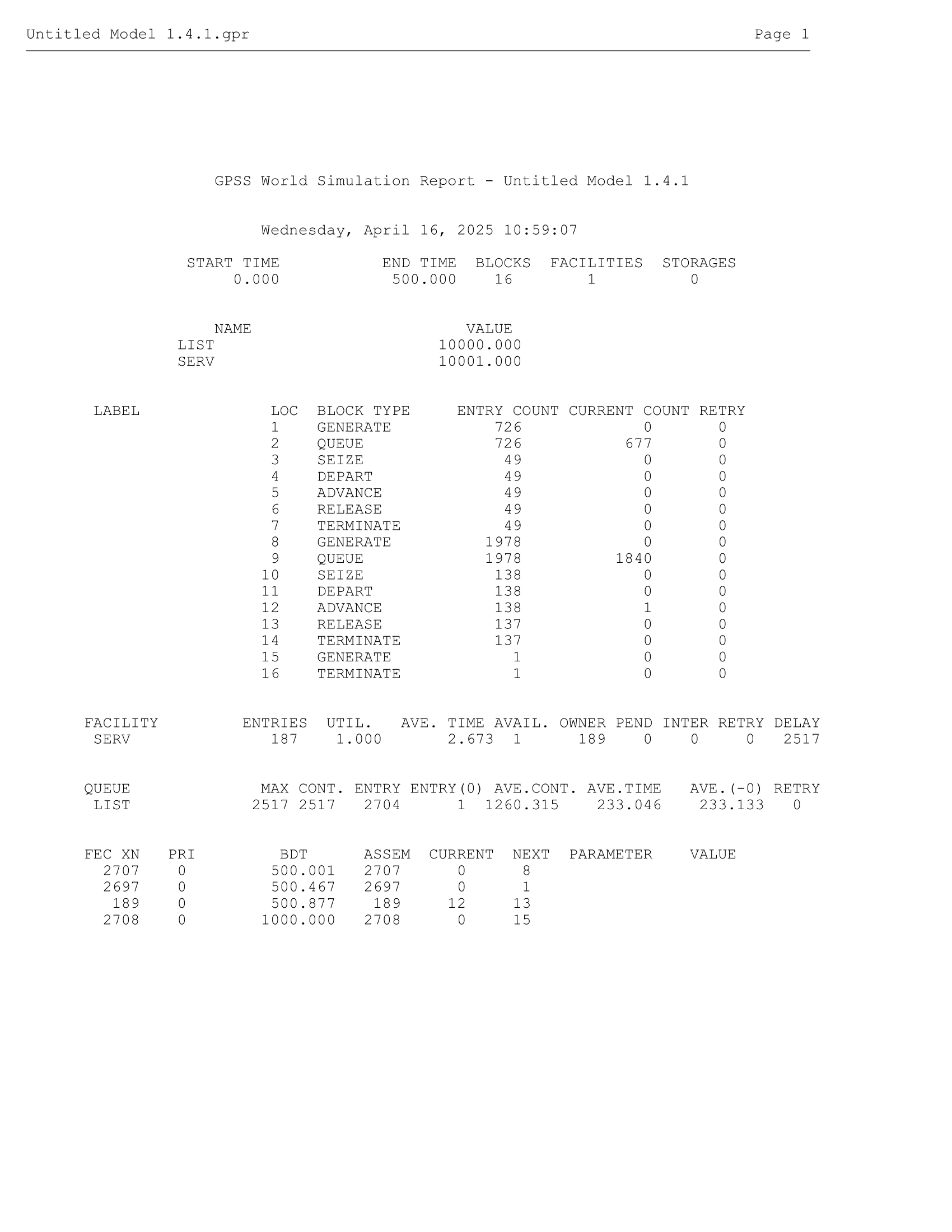
1. **Model Development Using GPSS (code of model and results)**
   1. **Code of the Model**

**A screenshot of a computer program

AI-generated content may be incorrect.**

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* 1. **Simulation Results**



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1. **Model Development with Anylogic**