

<b>Лабораторная работа 3</b>  <b>Построение стохастических динамических моделей с использованием системы Arena 14.0</b>	<b>ФИО студента</b>	<b>Титов А.К.</b>
	Группа	<b>ИВТ - 360</b>
	Вариант	<b>18</b>
	Дата отчета	
	Оценка	
	Подпись преподавателя	

**Задание 18.** Система автоматизации проектирования состоит из ЭВМ и трех терминалов. Каждый проектировщик формирует задание на расчет в интерактивном режиме. Набор строки задания занимает  $10 \pm 5$  с. Получение ответа на строку требует 3с работы ЭВМ и 5с работы терминала. После набора десяти строк задание считается сформированным и поступает на решение, при этом в течение  $10 \pm 3$ с ЭВМ прекращает выработку ответов на вводимые строки. Вывод результата требует 8с работы терминала. Анализ результата занимает у проектировщика 30с, после чего цикл повторяется. Смоделировать работу системы в течение 6 ч. Определить вероятность простоя проектировщика из-за занятости ЭВМ и коэффициент загрузки ЭВМ.

## Идея решения

Решение аналогично решению, реализованному во второй лабораторной работе.

Исключение составляет то, что вместо одной очереди в данной работе были использованы 2 очереди, ведущие к одному ресурсу (аналог одного кассира, работающего поочередно на двух кассах).

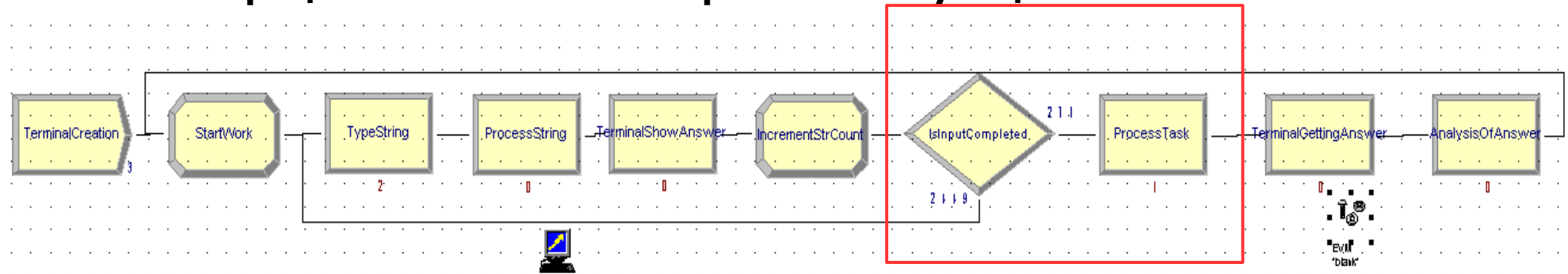
## Результаты симуляции из лабораторной работы № 2

Clock 21600.00

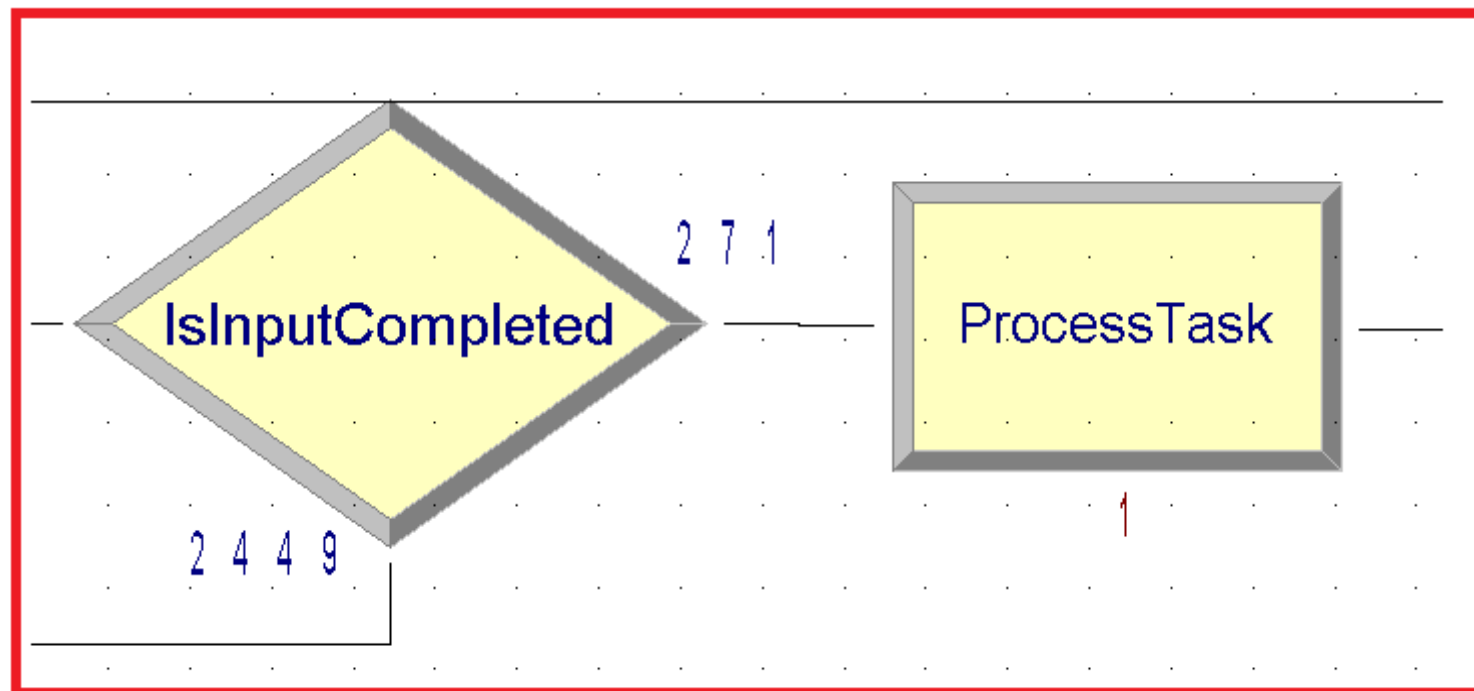
### Block counts

Number	Adr.	Oper.	Current	Total
1		GENERA		3
2	START	LET		274
3	INPUT	ADVANC	3	2730
4		SEIZE		2727
5		ADVANC		2727
6		RELEAS		2727
7		ADVANC		2727
8		LET		2727
9		IF		2727
10		SEIZE		271
11		ADVANC		271
12		RELEAS		271
13		ADVANC		271
14		ADVANC		271
15		GOTO		271
16		GENERA		1
17		TERMIN		1

## Блок схема процесса на момент завершения симуляции



## Участок, выделенный красным на изображении выше



## Окна настройки блоков (по порядку на схеме) TerminalCreation (**Create**)

The 'Create' dialog box for the TerminalCreation block contains the following fields and controls:

- Name:** TerminalCreation (dropdown)
- Entity Type:** TerminalWork (dropdown)
- Time Between Arrivals:**
  - Type:** Constant (dropdown)
  - Value:** 0 (text input)
  - Units:** Seconds (dropdown)
- Entities per Arrival:** 1 (text input)
- Max Arrivals:** 3 (text input)
- First Creation:** 0.0 (text input)
- Buttons:** OK, Cancel, Help

## StartWork(**Assign**)

The 'Assign' dialog box for the StartWork block contains the following fields and controls:

- Name:** StartWork (dropdown)
- Assignments:**
  - Attribute, StringCount, 0 (highlighted)
  - <End of list>
- Buttons:** Add..., Edit..., Delete, OK, Cancel, Help

## TypeString(**Process**)

The 'Process' dialog box for the TypeString block contains the following fields and controls:

- Name:** TypeString (dropdown)
- Type:** Standard (dropdown)
- Logic:**
  - Action:** Delay (dropdown)
- Delay Type:** Normal (dropdown)
- Units:** Seconds (dropdown)
- Allocation:** Value Added (dropdown)
- Value (Mean):** 10 (text input)
- Std Dev:** 5 (text input)
- Report Statistics:** ☐
- Buttons:** OK, Cancel, Help

## ProcessString(**Process**)

The screenshot shows the 'ProcessString' dialog box. It has a title bar with a question mark and a close button. The 'Name' field is set to 'ProcessString' and the 'Type' is 'Standard'. Under the 'Logic' section, the 'Action' is 'Seize Delay Release' and the 'Priority' is 'Medium(2)'. The 'Resources' list contains 'Resource, EVM, 1' and '<End of list>'. To the right of the resources list are buttons for 'Add...', 'Edit...', and 'Delete'. Below this, the 'Delay Type' is 'Constant', 'Units' are 'Seconds', and 'Allocation' is 'Value Added'. The 'Value' field is set to '3'. At the bottom, there is a checked checkbox for 'Report Statistics' and buttons for 'OK', 'Cancel', and 'Help'.

Process

Name: ProcessString Type: Standard

Logic

Action: Seize Delay Release Priority: Medium(2)

Resources:

Resource, EVM, 1  
<End of list>

Add...  
Edit...  
Delete

Delay Type: Constant Units: Seconds Allocation: Value Added

Value: 3

☒ Report Statistics

OK Cancel Help

## TerminalShowAnswer(**Process**)

The screenshot shows the 'TerminalShowAnswer' dialog box. It has a title bar with a question mark and a close button. The 'Name' field is set to 'TerminalShowAnswer' and the 'Type' is 'Standard'. Under the 'Logic' section, the 'Action' is 'Delay'. Below this, the 'Delay Type' is 'Constant', 'Units' are 'Seconds', and 'Allocation' is 'Value Added'. The 'Value' field is set to '5'. At the bottom, there is a checked checkbox for 'Report Statistics' and buttons for 'OK', 'Cancel', and 'Help'.

Process

Name: TerminalShowAnswer Type: Standard

Logic

Action: Delay

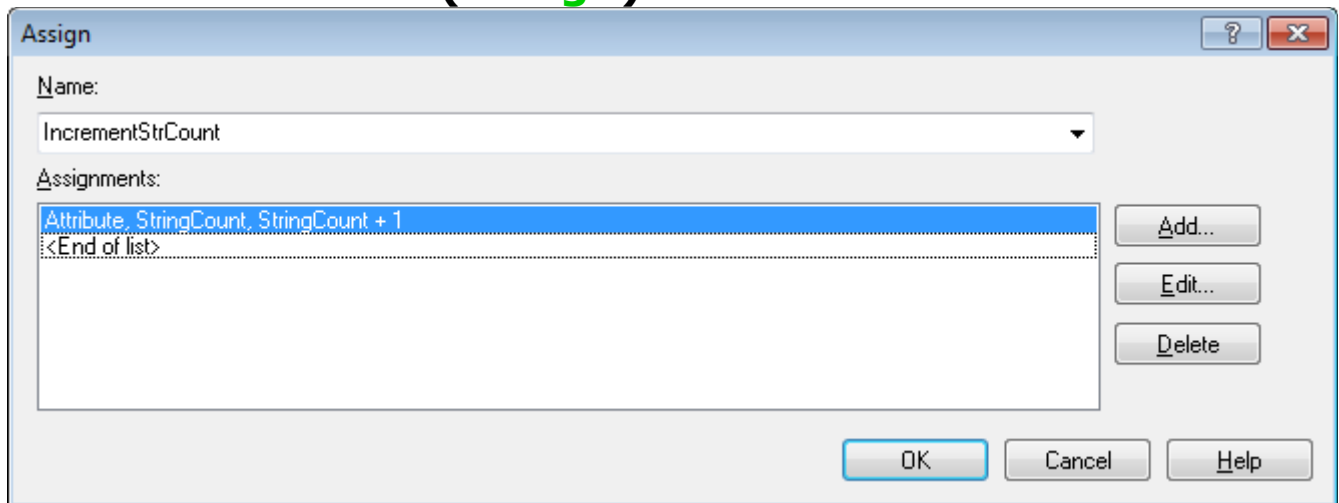
Delay Type: Constant Units: Seconds Allocation: Value Added

Value: 5

☒ Report Statistics

OK Cancel Help

## IncrementStrCount(Assign)



The Assign dialog box is used to define assignments for a task. It features a 'Name' field with 'IncrementStrCount' selected. The 'Assignments' list contains 'Attribute, StringCount, StringCount + 1' and '<End of list>'. To the right of the list are 'Add...', 'Edit...', and 'Delete' buttons. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

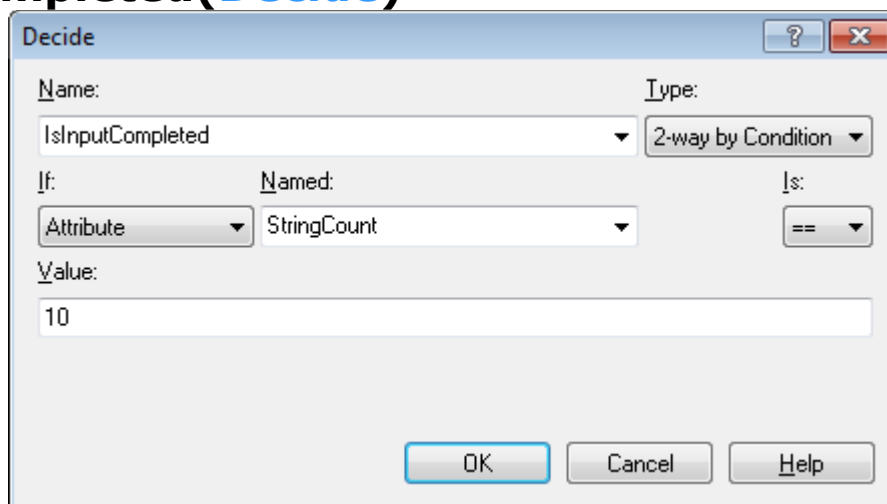
Name: IncrementStrCount

Assignments:

- Attribute, StringCount, StringCount + 1
- <End of list>

Buttons: Add..., Edit..., Delete, OK, Cancel, Help

## IsInputCompleted(Decide)



The Decide dialog box is used to define decision logic. It features a 'Name' field with 'IsInputCompleted' selected and a 'Type' dropdown set to '2-way by Condition'. The 'If' section shows 'Attribute' selected for 'StringCount' with an '==' operator. The 'Value' field contains '10'. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

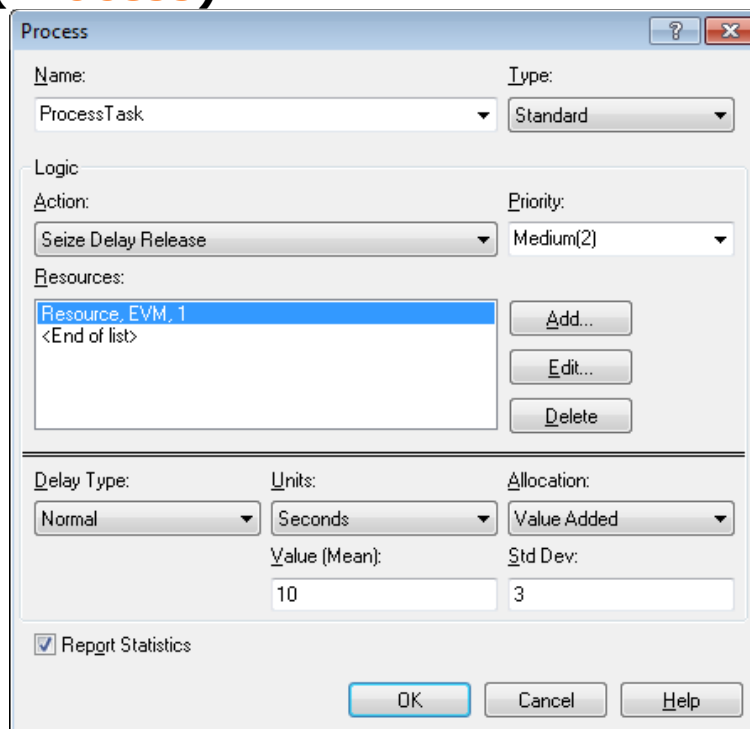
Name: IsInputCompleted Type: 2-way by Condition

If: Attribute Named: StringCount Is: ==

Value: 10

Buttons: OK, Cancel, Help

## ProcessTask(Process)



The Process dialog box is used to define process tasks. It features a 'Name' field with 'ProcessTask' selected and a 'Type' dropdown set to 'Standard'. The 'Logic' section shows 'Seize Delay Release' selected for 'Priority: Medium(2)'. The 'Resources' list contains 'Resource, EVM, 1' and '<End of list>'. The 'Delay Type' is 'Normal', 'Units' is 'Seconds', and 'Allocation' is 'Value Added'. The 'Value (Mean)' is '10' and 'Std Dev' is '3'. The 'Report Statistics' checkbox is checked. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

Name: ProcessTask Type: Standard

Logic:

Action: Seize Delay Release Priority: Medium(2)

Resources:

- Resource, EVM, 1
- <End of list>

Buttons: Add..., Edit..., Delete

Delay Type: Normal Units: Seconds Allocation: Value Added

Value (Mean): 10 Std Dev: 3

☒ Report Statistics

Buttons: OK, Cancel, Help

## TerminalGettingAnswer(Process)

The 'Process' dialog box for 'TerminalGettingAnswer' is shown. It has a title bar with a question mark and a close button. The 'Name' field is 'TerminalGettingAnswer' and the 'Type' is 'Standard'. The 'Logic' section shows 'Action' set to 'Delay'. The 'Delay Type' is 'Constant', 'Units' is 'Seconds', and 'Allocation' is 'Value Added'. The 'Value' field contains '8'. The 'Report Statistics' checkbox is checked. The 'OK', 'Cancel', and 'Help' buttons are at the bottom.

Process

Name: TerminalGettingAnswer Type: Standard

Logic

Action: Delay

Delay Type: Constant Units: Seconds Allocation: Value Added

Value: 8

☒ Report Statistics

OK Cancel Help

## AnalysisOfAnswer(Process)

The 'Process' dialog box for 'AnalysisOfAnswer' is shown. It has a title bar with a question mark and a close button. The 'Name' field is 'AnalysisOfAnswer' and the 'Type' is 'Standard'. The 'Logic' section shows 'Action' set to 'Delay'. The 'Delay Type' is 'Constant', 'Units' is 'Seconds', and 'Allocation' is 'Value Added'. The 'Value' field contains '30'. The 'Report Statistics' checkbox is checked. The 'OK', 'Cancel', and 'Help' buttons are at the bottom.

Process

Name: AnalysisOfAnswer Type: Standard

Logic

Action: Delay

Delay Type: Constant Units: Seconds Allocation: Value Added

Value: 30

☒ Report Statistics

OK Cancel Help