

Unit Test Report

for Public Transportation System

- Test Cases Specification
- Test Summary Report

Project Team

Team 5

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Team Information

201113247 강병주 / kk921221@naver.com

201312283 허지민 / jim-jim0511@hanmail.net

201311294 윤상은 / signsssss@naver.com

201311262 김민석 / makktub94@gmail.com

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1 Introduction

1.1 Objectives

이 문서는 T5의 Public Transportation System의 unit test를 수행하기 위해 작성된 계획 문서이며, 본 system이 제대로 작동하는지를 살펴보기 위해 필요한 요소들을 정리해 놓은 문서이다. 앞선 단계에서 진행했던 SRA 3.3의 State Transition Diagram을 바탕으로 test할 부분을 선정하였고, 각 기능이 제대로 수행되는 지 확인하는 것에 중점을 두어 작성하였다. Test를 수행하기 위해 필요한 활동 및 자원을 정의하고, test approach 및 techniques를 정의한다. 또한 test를 위한 환경적인 요구사항 및 test도구들을 정의한다.

1.2 References

PTS SRS 1.0

PTS SRA 3.3

PTS SDS 2.2

PTS UTP 1.0

2 Unit test case specification

2.1 Test case specification identifier

<Table 1> Test Case Identification with Valid Inputs

| Test Case Identifier | Input Specification | Output Specification |
|----------------------|--|--|
| PTS_UTCV_000_000 | 0001.txt 201411181523 M I 1950 BUS1219 MKU | card_data.day = 20141118 card_data.minute = 1523 card_data.transportaion = 'M' card_data.io = 'I' card_data.balance = 1950 card_data.readerID = "BUS1219" card_data.transfer = "MKU" |
| PTS_UTCV_000_001 | 0002.txt 201411190813 B I 1050 BUS0872 NOT | card_data.day = 20141119 card_data.minute = 0813 card_data.transportaion = 'B' card_data.io = 'I' |

| | | |
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| | | <p>card_data.balance = 1050 card_data.readerID = "BUS0872" card_data.transfer = "NOT"</p> |
| PTS_UTCV_000_002 | <p>0003.txt 201411202349 M I 1050 MDM1603 NOT</p> | <p>card_data.day = 20141120 card_data.minute = 2349 card_data.transportaion = 'M' card_data.io = 'I' card_data.balance = 1050 card_data.readerID = "MDM1603" card_data.transfer = "NOT"</p> |
| PTS_UTCV_001_000 | <p>card_data.day = 000000 card_data.minute = 0000 card_data.transportaion = NULL card_data.io = 'O' card_data.balance = 2000 card_data.readerID = "DEFAULT" card_data.transfer = "NOT"</p> <p>pts_data.day = 141118 pts_data.minute = 2112 pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 0014</p> | <p>card_data.day = 20141118 card_data.minute = 2112 card_data.transportaion = 'B' card_data.io = 'I' card_data.balance = 950 card_data.readerID = "BUS0014" card_data.transfer = "NOT"</p> <p>api_data.day = 20141118 api_data.minute = 2112 api_data.transportation = 'B' api_data.io = 'I' api_data.cost = 1050 api_data.readerID = "BUS0014" api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_001 | <p>card_data.day = 20141118 card_data.minute = 2135 card_data.transportaion = 'B' card_data.io = 'I' card_data.balance = 2000 card_data.readerID = "BUS0014" card_data.transfer = "NOT"</p> <p>pts_data.day = 20141118 pts_data.minute = 2140</p> | <p>card_data.day = 20141118 card_data.minute = 2140 card_data.transportaion = 'B' card_data.io = 'O' card_data.balance = 2000 card_data.readerID = "BUS0014" card_data.transfer = "NOT"</p> <p>api_data.day = 20141118 api_data.minute = 2135</p> |

| | | |
|------------------|---|---|
| | <p>pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 0030 d_sec = 0.625</p> | <p>api_data.transportation = 'B' api_data.io = 'O' api_data.cost = 0 api_data.readerID = "BUS0030" api_data.transfer = "NOT" cost = 0 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_002 | <p>card_data.day = 20141118 card_data.minute = 2149 card_data.transpotaion = 'B' card_data.io = 'I' card_data.balance = 2000 card_data.readerID = "BUS0014" card_data.transfer = "NOT" pts_data.day = 20141119 pts_data.minute = 0023 pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 0002 d_sec =</p> | <p>card_data.day = 20141119 card_data.minute = 0023 card_data.transpotaion = 'B' card_data.io = 'I' card_data.balance = 950 card_data.readerID = "BUS0002" card_data.transfer = "NOT" api_data.day = 20141119 api_data.minute = 0023 api_data.transportation = 'B' api_data.io = 'I' api_data.cost = 1050 api_data.readerID = "BUS0002" api_data.transfer = "NOT" cost = 1050 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_003 | <p>card_data.day = 20141118 card_data.minute = 2149 card_data.transpotaion = 'B' card_data.io = 'I' card_data.balance = 2000 card_data.readerID = "BUS0014" card_data.transfer = "NOT" pts_data.day = 20141118 pts_data.minute = 2245 pts_data.transportation = 'M'</p> | <p>card_data.day = 20141118 card_data.minute = 2245 card_data.transpotaion = 'M' card_data.io = 'I' card_data.balance = 950 card_data.readerID = "MKU0124" card_data.transfer = "NOT" api_data.day = 20141118 api_data.minute = 2245 api_data.transportation = 'M'</p> |

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|------------------|---|--|
| | <p>pts_data.readerID = "MKU" pts_data.count = 0124</p> <p>d_sec = 7</p> | <p>api_data.io = 'I' api_data.cost = 1050 api_data.readerID = "MKU0124" api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_004 | <p>card_data.day = 20141118 card_data.minute = 2149 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 2000 card_data.readerID = "MKU0386" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118 pts_data.minute = 2245 pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 0463</p> <p>d_sec = 7</p> | <p>card_data.day = 20141118 card_data.minute = 2245 card_data.transporaion = 'B' card_data.io = 'O' card_data.balance = 2000 card_data.readerID = "MKU0386" card_data.transfer = "BUS"</p> <p>api_data.day = 20141118 api_data.minute = 2245 api_data.transportation = 'B' api_data.io = 'O' api_data.cost = 0 api_data.readerID = "MKU0386" api_data.transfer = "BUS"</p> <p>cost = 0 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_005 | <p>card_data.day = 20141118 card_data.minute = 2149 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 2000 card_data.readerID = "MKU0386" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141119 pts_data.minute = 0012 pts_data.transportation = 'B' pts_data.readerID = "BUS"</p> | <p>card_data.day = 20141119 card_data.minute = 0012 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 250 card_data.readerID = "BUS0463" card_data.transfer = "NOT"</p> <p>api_data.day = 20141119 api_data.minute = 0012 api_data.transportation = 'B' api_data.io = 'I'</p> |

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|------------------|--|---|
| | <p>pts_data.count = 0463</p> <p>d_sec =</p> | <p>api_data.cost = 1750</p> <p>api_data.readerID = "BUS0463"</p> <p>api_data.transfer = "NOT"</p> <p>cost = 1050</p> <p>uncal_cost = 700</p> <p>enable = 1</p> |
| PTS_UTCV_001_006 | <p>card_data.day = 20141118</p> <p>card_data.minute = 2149</p> <p>card_data.transpotaion = 'B'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 2000</p> <p>card_data.readerID = "MKU0386"</p> <p>card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118</p> <p>pts_data.minute = 2223</p> <p>pts_data.transportation = 'M'</p> <p>pts_data.readerID = "MKU"</p> <p>pts_data.count = 0463</p> <p>d_sec = 4.25</p> | <p>card_data.day = 20141118</p> <p>card_data.minute = 2223</p> <p>card_data.transpotaion = 'M'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 250</p> <p>card_data.readerID = "MKU0463"</p> <p>card_data.transfer = "NOT"</p> <p>api_data.day = 20141118</p> <p>api_data.minute = 2223</p> <p>api_data.transportation = 'M'</p> <p>api_data.io = 'I'</p> <p>api_data.cost = 1750</p> <p>api_data.readerID = "MKU0463"</p> <p>api_data.transfer = "NOT"</p> <p>cost = 1050</p> <p>uncal_cost = 700</p> <p>enable = 1</p> |
| PTS_UTCV_001_007 | <p>card_data.day = 20141118</p> <p>card_data.minute = 2229</p> <p>card_data.transpotaion = 'B'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 1500</p> <p>card_data.readerID = "BUS1024"</p> <p>card_data.transfer = "NOT"</p> <p>pts_data.day = 20141119</p> <p>pts_data.minute = 0634</p> <p>pts_data.transportation = 'M'</p> <p>pts_data.readerID = "MKU"</p> <p>pts_data.count = 0187</p> | <p>card_data.day = 20141119</p> <p>card_data.minute = 0634</p> <p>card_data.transpotaion = 'M'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 450</p> <p>card_data.readerID = "MKU0187"</p> <p>card_data.transfer = "NOT"</p> <p>pts_data.readerID = "MKU0188"</p> <p>api_data.day = 20141119</p> <p>api_data.minute = 0634</p> <p>api_data.transportation = 'M'</p> |

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| | d_sec = | api_data.io = 'I' api_data.cost = 1050 api_data.readerID = "MKU0187" api_data.transfer = "NOT" cost = 1050 uncal_cost = 0 enable = 1 |
| PTS_UTCV_001_008 | card_data.day = 20141118 card_data.minute = 2229 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 1400 card_data.readerID = "MDM4872" card_data.transfer = "NOT" pts_data.day = 20141119 pts_data.minute = 0634 pts_data.transportation = 'M' pts_data.readerID = "MKU" pts_data.count = 0187 d_sec = | card_data.day = 20141118 card_data.minute = 2229 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 1400 card_data.readerID = "MDM4872" card_data.transfer = "NOT" cost = 1050 uncal_cost = 200 enable = 0 잔액 부족 탑승 불가 |
| PTS_UTCV_001_009 | card_data.day = 20141118 card_data.minute = 2229 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 1300 card_data.readerID = "MDM4872" card_data.transfer = "NOT" pts_data.day = 20141118 pts_data.minute = 2313 pts_data.transportation = 'B' pts_data.readerID = "BUS6309" pts_data.count = 6309 d_sec = 5.5 | card_data.day = 20141118 card_data.minute = 2313 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 50 card_data.readerID = "BUS6309" card_data.transfer = "NOT" pts_data.readerID = "BUS6310" api_data.day = 20141118 api_data.minute = 2213 api_data.transportation = 'B' api_data.io = 'I' api_data.cost = 1250 api_data.readerID = "BUS6309" |

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| | | <p>api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 200 enable = 1</p> |
| PTS_UTCV_001_010 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 800 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>pts_data.day = 20141118 pts_data.minute = 1707 pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 3903</p> <p>d_sec = 13</p> | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 800 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 0 enable = 0</p> <p>잔액 부족 탑승 불가</p> |
| PTS_UTCV_001_011 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 800 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>pts_data.day = 20141118 pts_data.minute = 1707 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 2010</p> <p>d_sec = 13</p> | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 800 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 200 enable = 0</p> <p>잔액 부족 탑승 불가</p> |
| PTS_UTCV_001_012 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O'</p> | <p>card_data.day = 20141118 card_data.minute = 1731 card_data.transporaion = 'M' card_data.io = 'I'</p> |

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| | <p>card_data.balance = 1300 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>pts_data.day = 20141118 pts_data.minute = 1731 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 2010</p> <p>d_sec = 16</p> | <p>card_data.balance = 250 card_data.readerID = "MHJ2010" card_data.transfer = "NOT"</p> <p>pts_data.readerID = "MHJ2011"</p> <p>api_data.day = 20141118 api_data.minute = 1731 api_data.transportation = 'M' api_data.io = 'I' api_data.cost = 1050 api_data.readerID = "MHJ2010" api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_001_013 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 1100 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>pts_data.day = 20141118 pts_data.minute = 1707 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 2010</p> <p>d_sec = 13</p> | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'O' card_data.balance = 1100 card_data.readerID = "MDM1549" card_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 0 enable = 0</p> <p>잔액 부족 탑승 불가</p> |
| PTS_UTCV_001_014 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 1700 card_data.readerID = "BUS2178" card_data.transfer = "MDM"</p> | <p>card_data.day = 20141119 card_data.minute = 0843 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 50 card_data.readerID = "BUS0791" card_data.transfer = "NOT"</p> |

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| | <p>pts_data.day = 20141119 pts_data.minute = 0843 pts_data.transportation = 'B' pts_data.readerID = "BUS" pts_data.count = 0791</p> <p>d_sec =</p> | <p>pts_data.readerID = "BUS0792"</p> <p>api_data.day = 20141119 api_data.minute = 0843 api_data.transportation = 'B' api_data.io = 'I' api_data.cost = 1650 api_data.readerID = "BUS0791" api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 600 enable = 1</p> |
| PTS_UTCV_001_015 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 1950 card_data.readerID = "MKU4219" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118 pts_data.minute = 1857 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 3195</p> <p>d_sec = 26.75</p> | <p>card_data.day = 20141118 card_data.minute = 1857 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 200 card_data.readerID = "MHJ3195" card_data.transfer = "NOT"</p> <p>pts_data.readerID = "MHJ3196"</p> <p>api_data.day = 20141118 api_data.minute = 1857 api_data.transportation = 'M' api_data.io = 'I' api_data.cost = 1750 api_data.readerID = "MHJ3195" api_data.transfer = "NOT"</p> <p>cost = 1050 uncal_cost = 700 enable = 1</p> |
| PTS_UTCV_001_016 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'I'</p> | <p>card_data.day = 20141118 card_data.minute = 1857 card_data.transporaion = 'M' card_data.io = 'O'</p> |

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| | <p>card_data.balance = 1300 card_data.readerID = "BUS1219" card_data.transfer = "MKU"</p> <p>pts_data.day = 20141118 pts_data.minute = 1857 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 3195</p> <p>d_sec = 26.75</p> | <p>card_data.balance = 1000 card_data.readerID = "BUS1219" card_data.transfer = "MKU"</p> <p>api_data.day = 20141118 api_data.minute = 1857 api_data.transportation = 'M' api_data.io = 'O' api_data.cost = 300 api_data.readerID = "BUS1219" api_data.transfer = "MKU"</p> <p>cost = 300 uncal_cost = 0 enable = 1</p> |
| PTS_UTCV_002_000 | <p>enable = 1 balance = 950 cost = 1050</p> | <p>O Cost : 1050 Balance :950</p> |
| PTS_UTCV_002_001 | <p>enable = 0 balance = 950 cost = 0</p> | <p>X Balance :950</p> |
| PTS_UTCV_003_000 | <p>card_data.day = 20141118 card_data.minute = 1523 card_data.transporaion = 'M' card_data.io = 'I' card_data.balance = 1950 card_data.readerID = "BUS1219" card_data.transfer = "MKU"</p> | <p>0001.txt 201411181523 M I 1950 BUS1219 MKU</p> |
| PTS_UTCV_003_001 | <p>card_data.day = 20141119 card_data.minute = 0813 card_data.transporaion = 'B' card_data.io = 'I' card_data.balance = 1050 card_data.readerID = "BUS0872" card_data.transfer = "NOT"</p> | <p>0002.txt 201411190813 B I 1050 BUS0872 NOT</p> |
| PTS_UTCV_003_002 | <p>card_data.day = 20141120 card_data.minute = 2349 card_data.transporaion = 'M'</p> | <p>0003.txt 201311202349 M I 1050 MDM1603 NOT</p> |

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| | card_data.io = 'I' card_data.balance = 1050 card_data.readerID = "MDM1603" card_data.transfer = "NOT" | |
| PTS_UTCV_004_000 | <Table 4> Test Cases with Integrated Linked List – Test Case 1 참조 | <Table 5> Test Cases with Sorted Linked List – Test Case 1 참조 |
| PTS_UTCV_004_001 | <Table 4> Test Cases with Integrated Linked List – Test Case 2 참조 | <Table 5> Test Cases with Sorted Linked List – Test Case 2 참조 |
| PTS_UTCV_004_002 | <Table 4> Test Cases with Integrated Linked List – Test Case 3 참조 | <Table 5> Test Cases with Sorted Linked List – Test Case 3 참조 |
| PTS_UTCV_005_000 | <Table 5> Test Cases with Sorted Linked List – Test Case 1 참조 | T : 3550 B : 1050 M : 2500 |
| PTS_UTCV_005_001 | <Table 5> Test Cases with Sorted Linked List – Test Case 2 참조 | T : 5300 B : 2100 M : 3200 |
| PTS_UTCV_005_002 | <Table 5> Test Cases with Sorted Linked List – Test Case 3 참조 | T : 3700 B : 2938 M : 761 |

<Table 2> Test Cases with Integrated Linked List

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|--------------------|---|
| Test Case 1 | 1. api_data.day = 20141115 api_data.minute = 1050 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MKU0002 api_data.nextData = 2 |
| | 2. api_data.day = 20141115 api_data.minute = 0824 |

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| | <p>api_data.transportation = 'B' api_data.io = 'o' api_data.cost = 0 api_data.readerID = BUS0001 api_data.nextData =3</p> <p>3.</p> <p>api_data.day = 20141115 api_data.minute = 0432 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0001 api_data.nextData = 4</p> <p>4.</p> <p>api_data.day = 20141115 api_data.minute =1749 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MDM0001 api_data.nextData = 5</p> <p>5.</p> <p>api_data.day = 20141115 api_data.minute = 1123 api_data.transportation = 'M' api_data.io = 'o' api_data.cost = 200 api_data.readerID = MKU0002 api_data.nextData = NULL</p> |
| <p>Test Case 2</p> | <p>1.</p> <p>api_data.day = 20141116 api_data.minute = 0613 api_data.transportation = 'M' api_data.io = 'i'</p> |

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| | <p>api_data.cost = 1750 api_data.readerID = MHJ0001 api_data.nextData = 2</p> |
| | <p>2.</p> <p>api_data.day = 20141116 api_data.minute = 1326 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0002 api_data.nextData =3</p> |
| | <p>3.</p> <p>api_data.day = 20141116 api_data.minute = 1141 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MGN0001 api_data.nextData = 4</p> |
| | <p>4.</p> <p>api_data.day = 20141116 api_data.minute =2118 api_data.transportation = 'B' api_data.io = 'o' api_data.cost = 0 api_data.readerID = BUS0002 api_data.nextData = 5</p> |
| | <p>5.</p> <p>api_data.day = 20141116 api_data.minute = 0908 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0001</p> |

| | |
|--------------------|---|
| | api_data.nextData = NULL |
| Test Case 3 | 1. api_data.day = 20141117 api_data.minute = 1038 api_data.transportation = 'M' api_data.io = 'o' api_data.cost = 200 api_data.readerID = MHJ0001 api_data.nextData = 2 |
| | 2. api_data.day = 20141117 api_data.minute = 1407 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 0 api_data.readerID = MHJ0001 api_data.nextData = 3 |
| | 3. api_data.day = 20141117 api_data.minute = 1939 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1750 api_data.readerID = BUS0001 api_data.nextData = 4 |
| | 4. api_data.day = 20141117 api_data.minute = 0821 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MHJ0001 api_data.nextData = 5 |
| | 5. |

| | |
|--|--|
| | <p>api_data.day = 20141116 api_data.minute = 2345 api_data.transportation = 'B' api_data.io = 'o' api_data.cost = 0 api_data.readerID = BUS0001 api_data.nextData = NULL</p> |
|--|--|

3

<Table 3> Test Cases with Sorted Linked List

| | |
|--------------------|---|
| Test Case 1 | <p>1</p> <p>api_data.day = 20141115 api_data.minute = 0432 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0001 api_data.nextData = 2</p> |
| | <p>2</p> <p>api_data.day = 20141115 api_data.minute = 0824 api_data.transportation = 'B' api_data.io = 'o' api_data.cost = 0 api_data.readerID = BUS0001 api_data.nextData = 3</p> |
| | <p>3</p> <p>api_data.day = 20141115 api_data.minute = 1050 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MKU0002 api_data.nextData = 4</p> |

| | |
|--------------------|---|
| | <p>4</p> <p>api_data.day = 20141115 api_data.minute = 1123 api_data.transportation = 'M' api_data.io = 'o' api_data.cost = 200 api_data.readerID = MKU0002 api_data.nextData =5</p> |
| | <p>5</p> <p>api_data.day = 20141115 api_data.minute =1749 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MDM0001 api_data.nextData = NULL</p> |
| Test Case 2 | <p>1</p> <p>api_data.day = 20141116 api_data.minute = 0613 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1750 api_data.readerID = MHJ0001 api_data.nextData = 2</p> |
| | <p>2</p> <p>api_data.day = 20141116 api_data.minute = 0908 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0001 api_data.nextData =3</p> |
| | <p>3</p> |

| | |
|---------------------------|---|
| | <p>api_data.day = 20141116 api_data.minute = 1141 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MGN0001 api_data.nextData = 4</p> |
| | <p>4</p> <p>api_data.day = 20141116 api_data.minute = 1326 api_data.transportation = 'B' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = BUS0002 api_data.nextData =5</p> |
| | <p>5</p> <p>api_data.day = 20141116 api_data.minute =2118 api_data.transportation = 'B' api_data.io = 'o' api_data.cost = 0 api_data.readerID = BUS0002 api_data.nextData = NULL</p> |
| <p>Test Case 3</p> | <p>1</p> <p>api_data.day = 20141117 api_data.minute = 0821 api_data.transportation = 'M' api_data.io = 'i' api_data.cost = 1050 api_data.readerID = MHJ0001 api_data.nextData = 2</p> <p>2</p> <p>api_data.day = 20141117 api_data.minute = 1038</p> |

| | |
|--|--|
| | <p>api_data.transportation = 'M'</p> <p>api_data.io = 'o'</p> <p>api_data.cost = 200</p> <p>api_data.readerID = MHJ0001</p> <p>api_data.nextData =3</p> |
| | <p>3</p> <p>api_data.day = 20141117</p> <p>api_data.minute = 1407</p> <p>api_data.transportation = 'B'</p> <p>api_data.io = 'i'</p> <p>api_data.cost = 0</p> <p>api_data.readerID = MHJ0001</p> <p>api_data.nextData = 4</p> |
| | <p>4</p> <p>api_data.day = 20141117</p> <p>api_data.minute = 1939</p> <p>api_data.transportation = 'B'</p> <p>api_data.io = 'i'</p> <p>api_data.cost = 1750</p> <p>api_data.readerID = BUS0001</p> <p>api_data.nextData =5</p> |
| | <p>5</p> <p>api_data.day = 20141116</p> <p>api_data.minute =2345</p> <p>api_data.transportation = 'B'</p> <p>api_data.io = 'o'</p> <p>api_data.cost = 0</p> <p>api_data.readerID = BUS0001</p> <p>api_data.nextData = NULL</p> |

4

<Table 4> List of Invalid Inputs of Each Identifier

| Identifier | Feature (Process ID in DFD) | Invalid Value |
|------------------|--------------------------------|------------------------|
| PTS_UTSI_000_000 | A2.1 Decision Controller | card_data.day = 840713 |

| | | |
|------------------|--------------------------|---|
| | | <p>card_data.minute = 1523 card_data.transportaion = 'B' card_data.io = 'i' card_data.balance = 1950 card_data.readerID = "MKU4219" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118 pts_data.minute = 1857 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 3195</p> <p>d_sec = 26.75</p> |
| PTS_UTSI_000_001 | A2.1 Decision Controller | <p>card_data.day = 20141118 card_data.minute = 123 card_data.transportaion = 'B' card_data.io = 'i' card_data.balance = 1950 card_data.readerID = "MKU4219" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118 pts_data.minute = 1857 pts_data.transportation = 'M' pts_data.readerID = "MHJ" pts_data.count = 3195</p> <p>d_sec = 26.75</p> |
| PTS_UTSI_000_002 | A2.1 Decision Controller | <p>card_data.day = 20141118 card_data.minute = 2785 card_data.transportaion = 'B' card_data.io = 'i' card_data.balance = 1950 card_data.readerID = "MKU4219" card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118 pts_data.minute = 1857</p> |

| | | |
|------------------|--------------------------|---|
| | | <p>pts_data.transportation = 'M'</p> <p>pts_data.readerID = "MHJ"</p> <p>pts_data.count = 3195</p> <p>d_sec = 26.75</p> |
| PTS_UTSI_000_003 | A2.1 Decision Controller | <p>card_data.day = 20141118</p> <p>card_data.minute = 1523</p> <p>card_data.transporaion = 'B'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 3000000000</p> <p>card_data.readerID = "MKU4219"</p> <p>card_data.transfer = "BUS"</p> <p>pts_data.day = 20141118</p> <p>pts_data.minute = 1857</p> <p>pts_data.transportation = 'M'</p> <p>pts_data.readerID = "MHJ3195"</p> <p>pts_data.count = 3195</p> <p>d_sec = 26.75</p> |
| PTS_UTSI_000_004 | A2.1 Decision Controller | <p>card_data.day = 20141118</p> <p>card_data.minute = 1523</p> <p>card_data.transporaion = 'B'</p> <p>card_data.io = 'I'</p> <p>card_data.balance = 1950</p> <p>card_data.readerID = "MKU42190"</p> <p>card_data.transfer = "BU"</p> <p>pts_data.day = 20141118</p> <p>pts_data.minute = 1857</p> <p>pts_data.transportation = 'M'</p> <p>pts_data.readerID = "MHJ3195"</p> <p>pts_data.count = 3195</p> <p>d_sec = 26.75</p> |
| PTS_UTSI_000_005 | A2.1 Decision Controller | <p>card_data.day = 20141118</p> <p>card_data.minute = 1523</p> <p>card_data.transporaion = 'B'</p> <p>card_data.io = 'I'</p> |

| | | |
|--|--|--|
| | | <pre> card_data.balance = 1950 card_data.readerID = "MKU42190" card_data.transfer = "BU" pts_data.day = 20141115 pts_data.minute = 1857 pts_data.transportation = 'M' pts_data.readerID = "MHJ3195" pts_data.count = 3195 d_sec = 26.75 </pre> |
|--|--|--|

4.1 Test items

<Table 1> 참조

4.2 Input specifications

<Table 1> 참조

4.3 Output specifications

<Table 1> 참조

5 Environmental needs

Public Transportation System의 Unit Test를 위한 환경적 요구사항은 다음과 같다.

5.1 Hardware& Platform – Socket 과 Thread를 제외한 나머지 모듈들은 Visual Studio에서, Socket 과 Thread는 Cygwin에서 진행한다.

6 Unit test summary report

6.1 Test summary report identifier

```

~/DDD
$ ./test
Test Case Identifier: PTS_UTCV_000_000
name of txt : 0001
day : 20141118
minute : 1523
transportation : M
io : I
balance : 1950
readerID : BUS1219
transfer : MKU
  
```

0001.txt - 메모장

```

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
201411181523 M | 1950 BUS1219 MKU
  
```

PTS_UTCV_000_000

```

~/DDD
$ ./TEST
Test Case Identifier: PTS_UTCV_000_001
name of txt : 0002
day : 20141119
minute : 0813
transportation : B
io : I
balance : 1050
readerID : BUS0872
transfer : NOT
  
```

0002.txt - 메모장

```

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
201411190813 B | 1050 BUS0872 NOT
  
```

PTS_UTCV_000_001

```

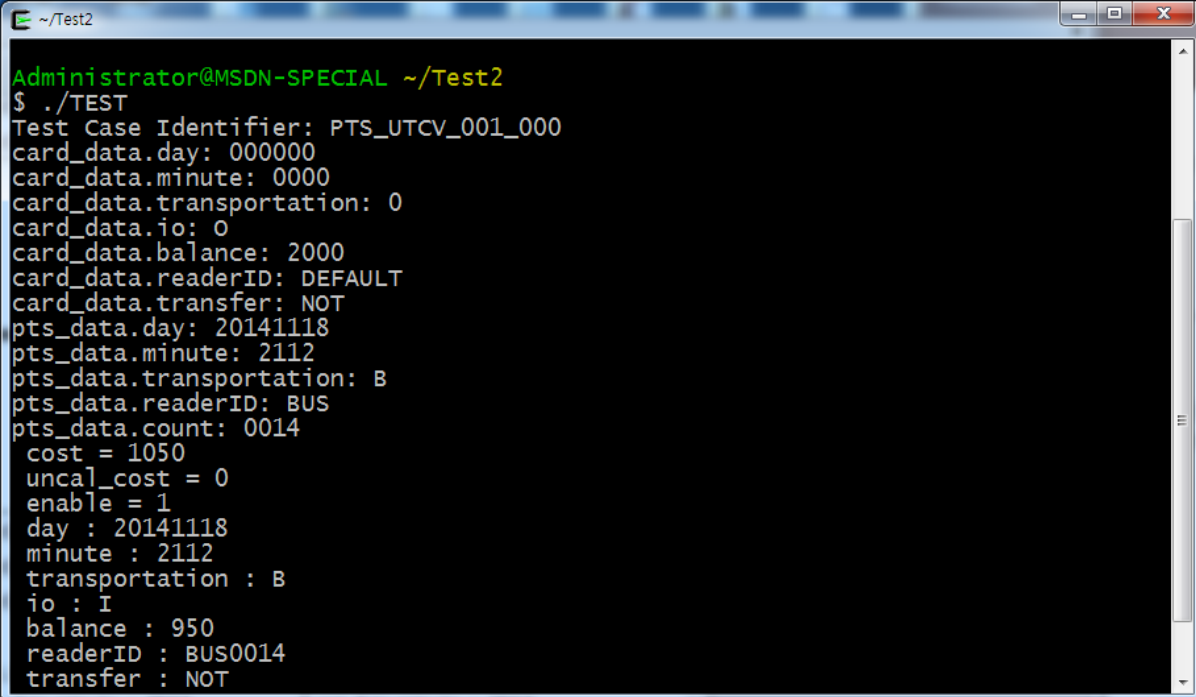
~/DDD
$ ./TEST
Test Case Identifier: PTS_UTCV_000_002
name of txt : 0003
day : 20141120
minute : 2349
transportation : M
io : I
balance : 1050
readerID : MDM1603
transfer : NOT
  
```

0003.txt - 메모장

```

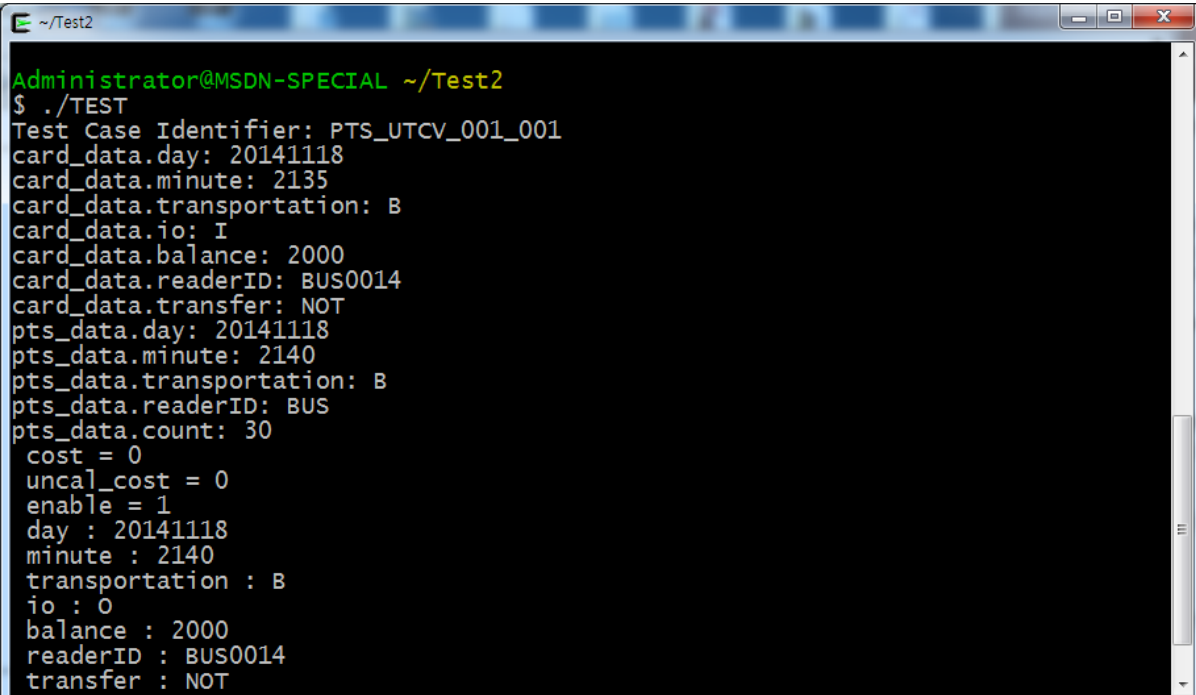
파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
201411202349 M | 1050 MDM1603 NOT
  
```

PTS_UTCV_000_002



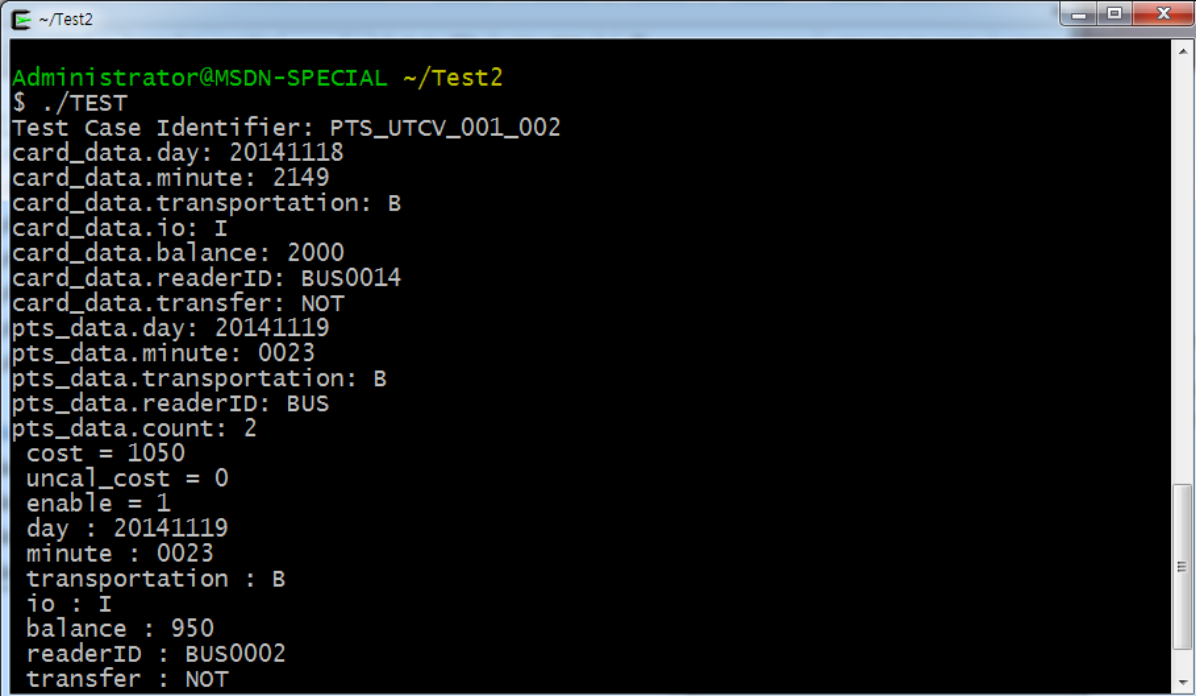
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_000
card_data.day: 000000
card_data.minute: 0000
card_data.transportation: 0
card_data.io: 0
card_data.balance: 2000
card_data.readerID: DEFAULT
card_data.transfer: NOT
pts_data.day: 20141118
pts_data.minute: 2112
pts_data.transportation: B
pts_data.readerID: BUS
pts_data.count: 0014
cost = 1050
uncal_cost = 0
enable = 1
day : 20141118
minute : 2112
transportation : B
io : I
balance : 950
readerID : BUS0014
transfer : NOT
```

PTS_UTCV_001_000



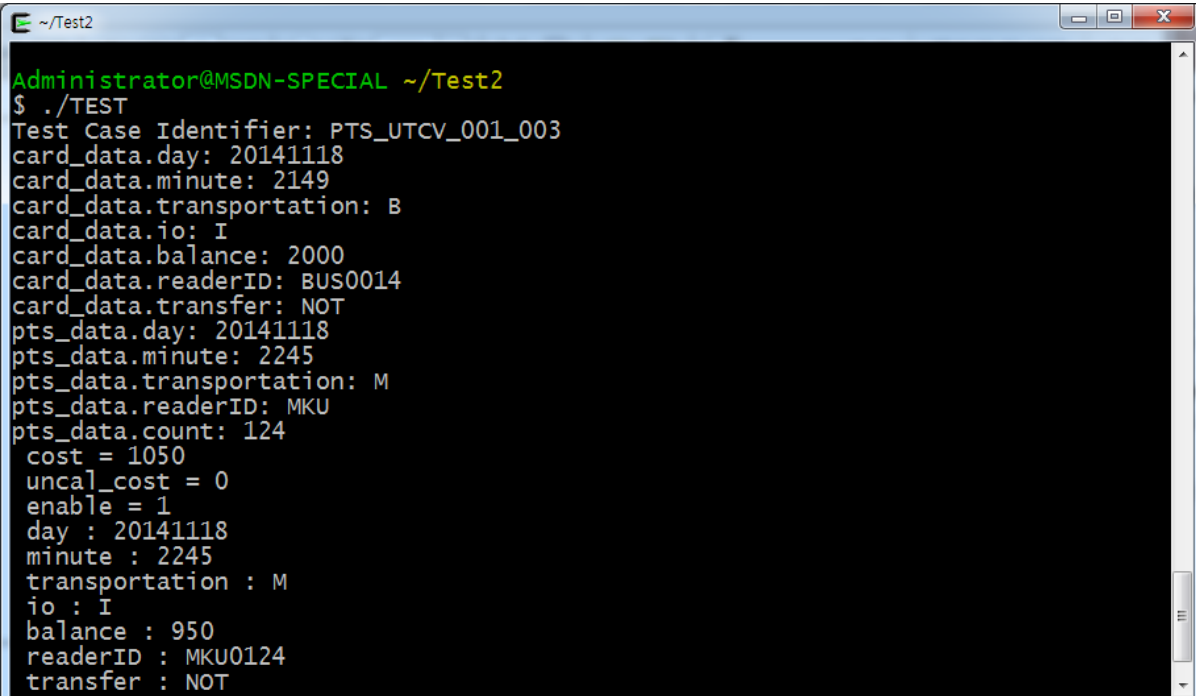
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_001
card_data.day: 20141118
card_data.minute: 2135
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: BUS0014
card_data.transfer: NOT
pts_data.day: 20141118
pts_data.minute: 2140
pts_data.transportation: B
pts_data.readerID: BUS
pts_data.count: 30
cost = 0
uncal_cost = 0
enable = 1
day : 20141118
minute : 2140
transportation : B
io : 0
balance : 2000
readerID : BUS0014
transfer : NOT
```

PTS_UTCV_001_001



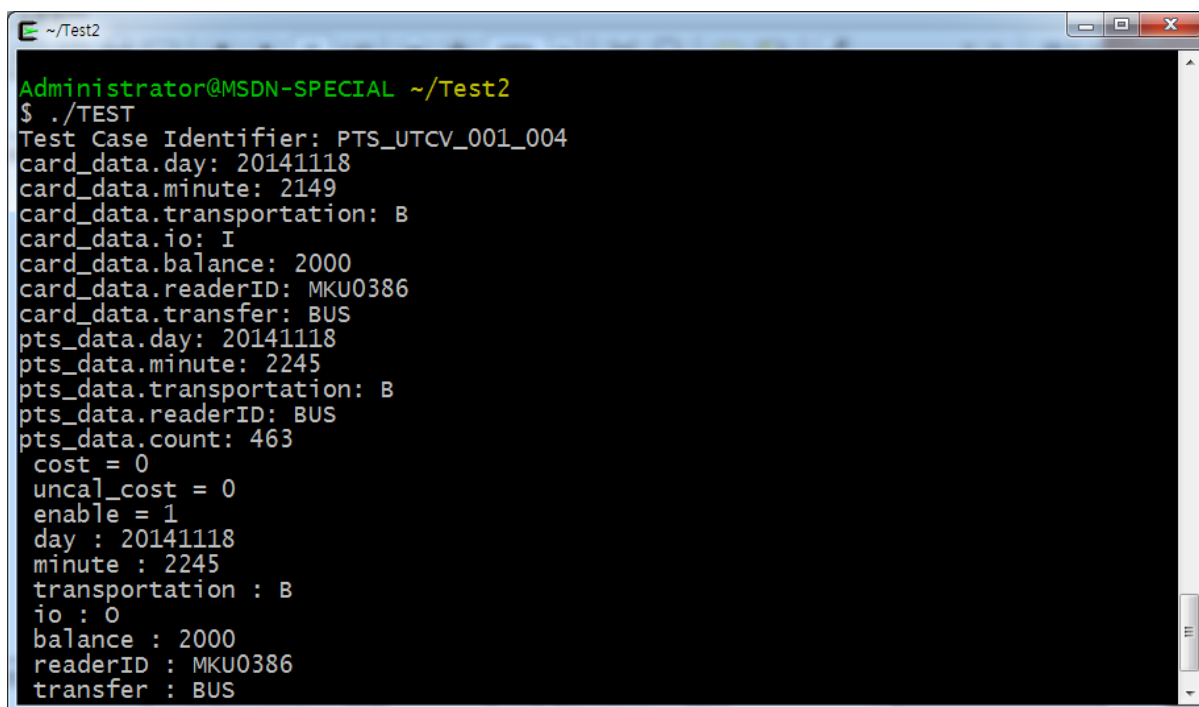
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_002
card_data.day: 20141118
card_data.minute: 2149
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: BUS0014
card_data.transfer: NOT
pts_data.day: 20141119
pts_data.minute: 0023
pts_data.transportation: B
pts_data.readerID: BUS
pts_data.count: 2
  cost = 1050
  uncal_cost = 0
  enable = 1
  day : 20141119
  minute : 0023
  transportation : B
  io : I
  balance : 950
  readerID : BUS0002
  transfer : NOT
```

PTS_UTCV_001_002



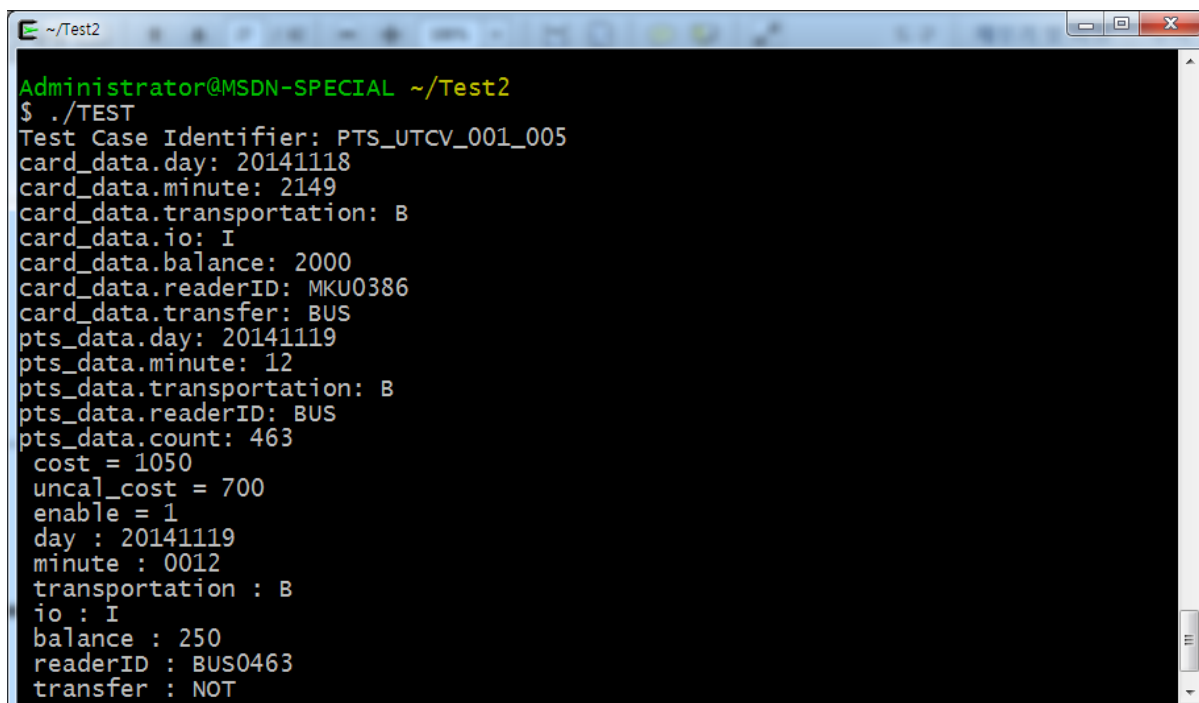
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_003
card_data.day: 20141118
card_data.minute: 2149
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: BUS0014
card_data.transfer: NOT
pts_data.day: 20141118
pts_data.minute: 2245
pts_data.transportation: M
pts_data.readerID: MKU
pts_data.count: 124
  cost = 1050
  uncal_cost = 0
  enable = 1
  day : 20141118
  minute : 2245
  transportation : M
  io : I
  balance : 950
  readerID : MKU0124
  transfer : NOT
```

PTS_UTCV_001_003



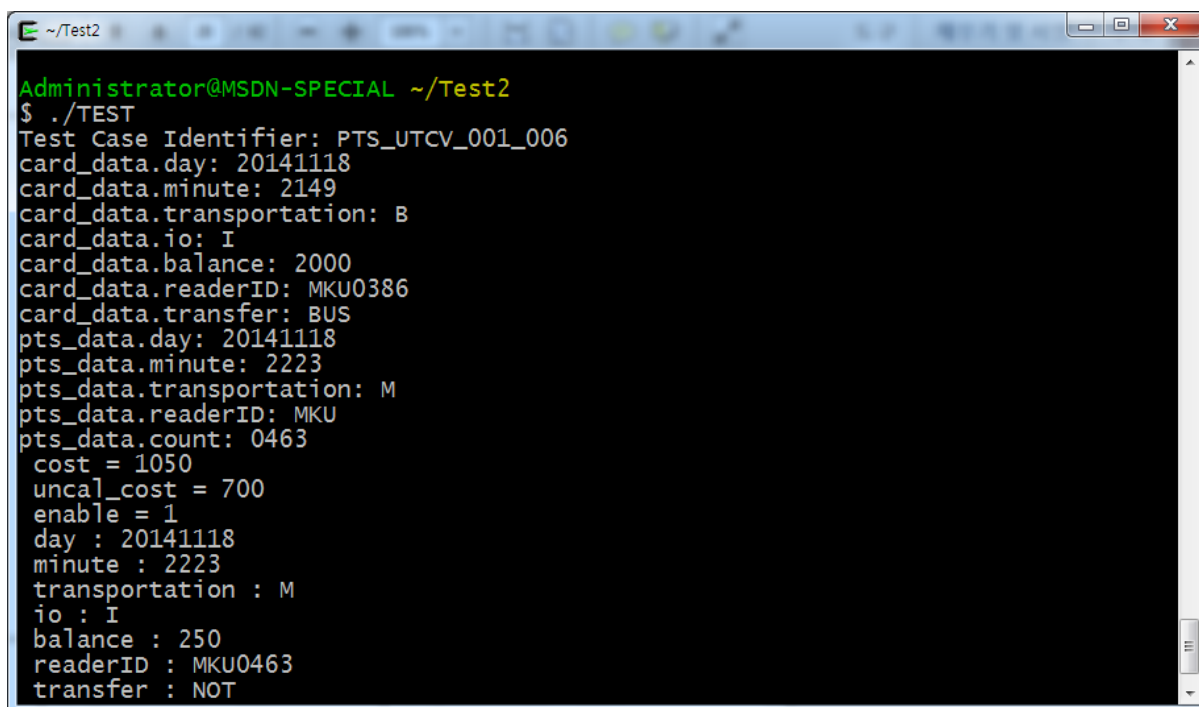
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_004
card_data.day: 20141118
card_data.minute: 2149
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: MKU0386
card_data.transfer: BUS
pts_data.day: 20141118
pts_data.minute: 2245
pts_data.transportation: B
pts_data.readerID: BUS
pts_data.count: 463
cost = 0
uncal_cost = 0
enable = 1
day : 20141118
minute : 2245
transportation : B
io : 0
balance : 2000
readerID : MKU0386
transfer : BUS
```

PTS_UTCV_001_004



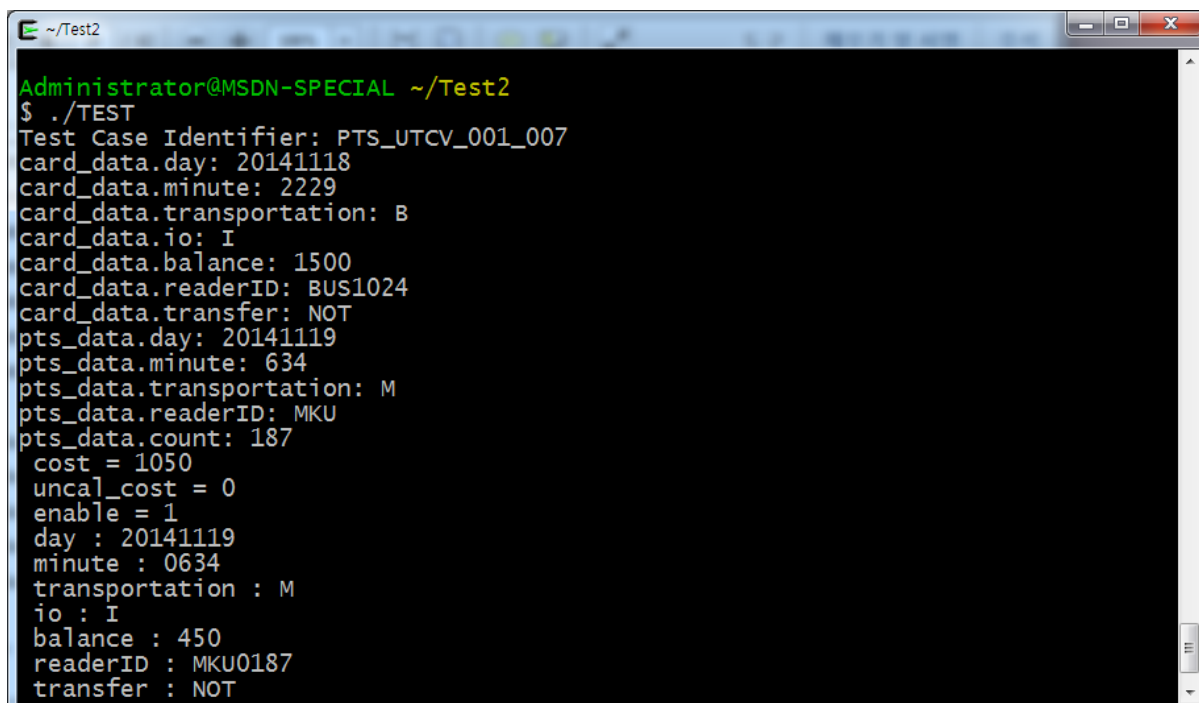
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_005
card_data.day: 20141118
card_data.minute: 2149
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: MKU0386
card_data.transfer: BUS
pts_data.day: 20141119
pts_data.minute: 12
pts_data.transportation: B
pts_data.readerID: BUS
pts_data.count: 463
cost = 1050
uncal_cost = 700
enable = 1
day : 20141119
minute : 0012
transportation : B
io : I
balance : 250
readerID : BUS0463
transfer : NOT
```

PTS_UTCV_001_005



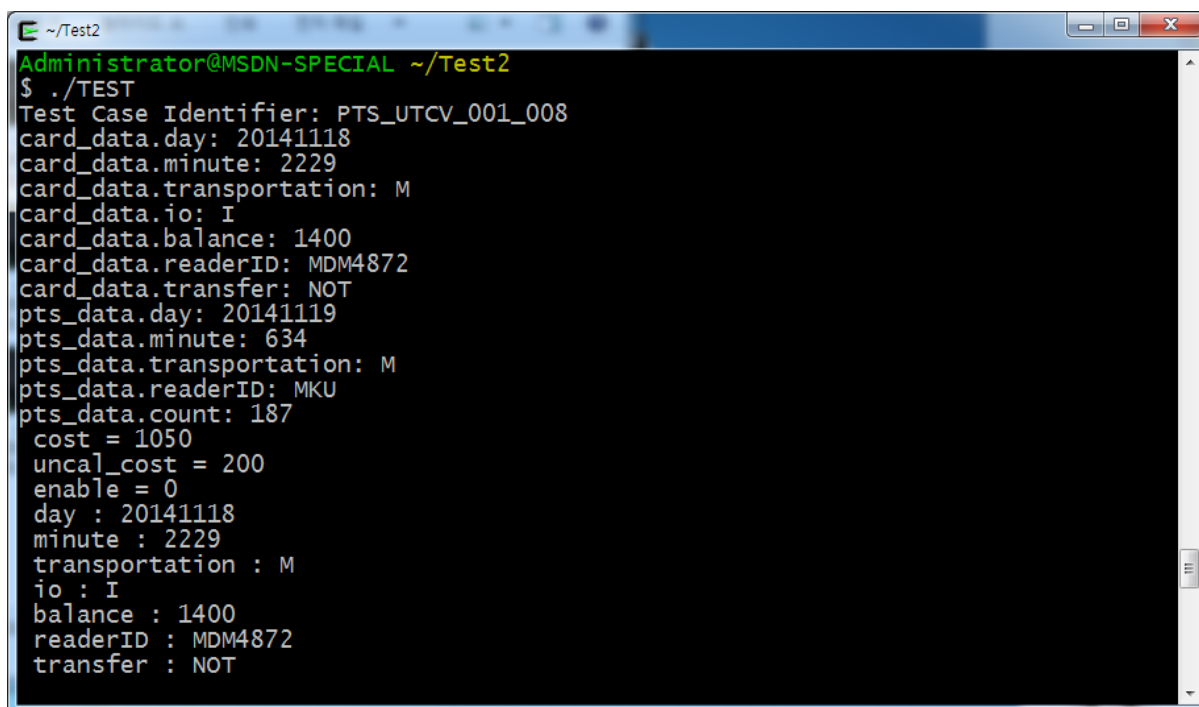
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_006
card_data.day: 20141118
card_data.minute: 2149
card_data.transportation: B
card_data.io: I
card_data.balance: 2000
card_data.readerID: MKU0386
card_data.transfer: BUS
pts_data.day: 20141118
pts_data.minute: 2223
pts_data.transportation: M
pts_data.readerID: MKU
pts_data.count: 0463
cost = 1050
uncal_cost = 700
enable = 1
day : 20141118
minute : 2223
transportation : M
io : I
balance : 250
readerID : MKU0463
transfer : NOT
```

PTS_UTCV_001_006



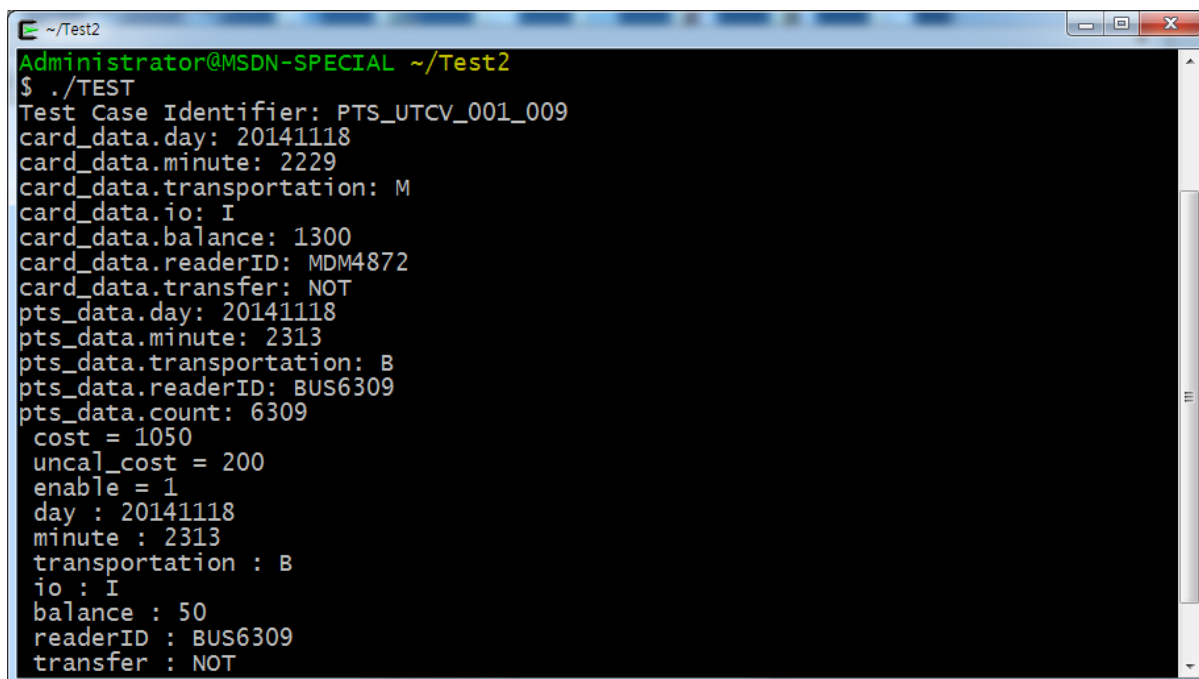
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_007
card_data.day: 20141118
card_data.minute: 2229
card_data.transportation: B
card_data.io: I
card_data.balance: 1500
card_data.readerID: BUS1024
card_data.transfer: NOT
pts_data.day: 20141119
pts_data.minute: 634
pts_data.transportation: M
pts_data.readerID: MKU
pts_data.count: 187
cost = 1050
uncal_cost = 0
enable = 1
day : 20141119
minute : 0634
transportation : M
io : I
balance : 450
readerID : MKU0187
transfer : NOT
```

PTS_UTCV_001_007



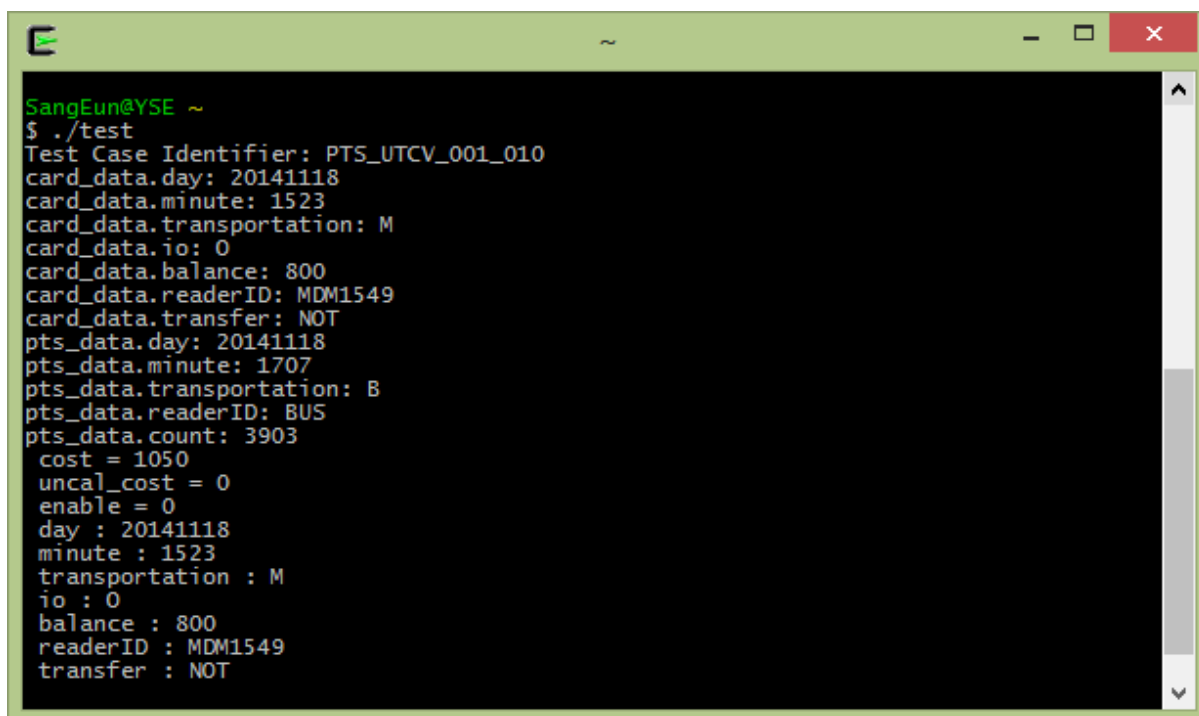
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_008
card_data.day: 20141118
card_data.minute: 2229
card_data.transportation: M
card_data.io: I
card_data.balance: 1400
card_data.readerID: MDM4872
card_data.transfer: NOT
pts_data.day: 20141119
pts_data.minute: 634
pts_data.transportation: M
pts_data.readerID: MKU
pts_data.count: 187
cost = 1050
uncal_cost = 200
enable = 0
day : 20141118
minute : 2229
transportation : M
io : I
balance : 1400
readerID : MDM4872
transfer : NOT
```

PTS_UTCV_001_008



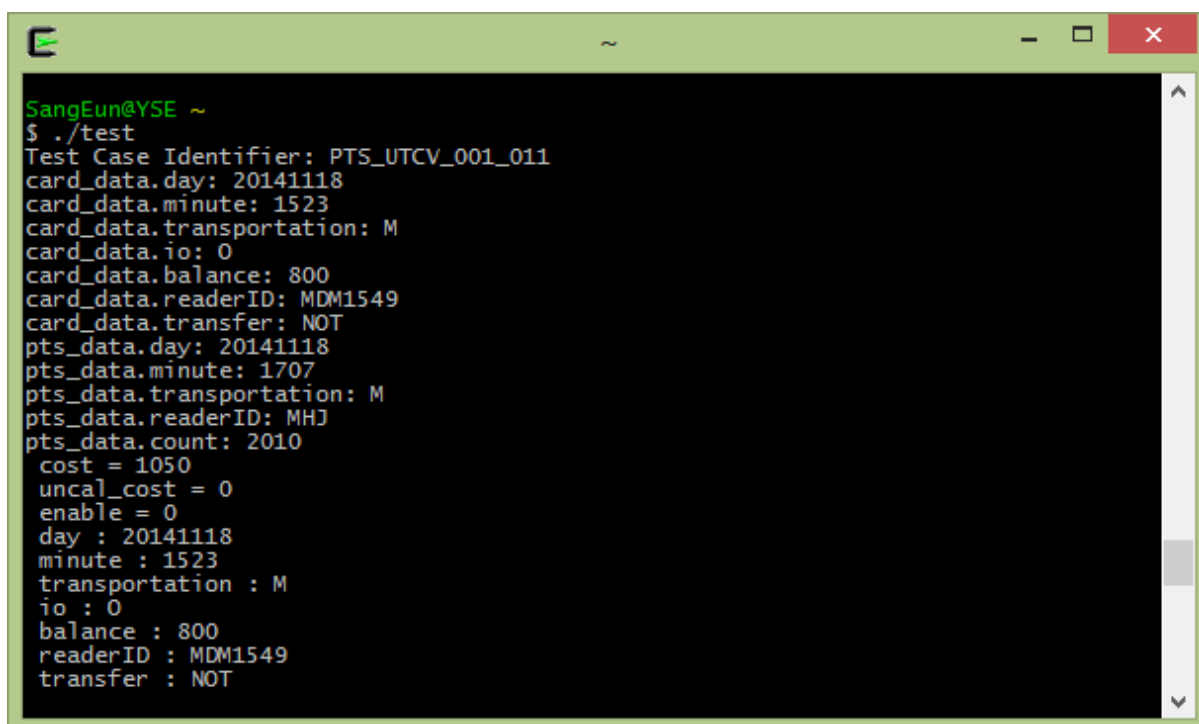
```
Administrator@MSDN-SPECIAL ~/Test2
$ ./TEST
Test Case Identifier: PTS_UTCV_001_009
card_data.day: 20141118
card_data.minute: 2229
card_data.transportation: M
card_data.io: I
card_data.balance: 1300
card_data.readerID: MDM4872
card_data.transfer: NOT
pts_data.day: 20141118
pts_data.minute: 2313
pts_data.transportation: B
pts_data.readerID: BUS6309
pts_data.count: 6309
cost = 1050
uncal_cost = 200
enable = 1
day : 20141118
minute : 2313
transportation : B
io : I
balance : 50
readerID : BUS6309
transfer : NOT
```

PTS_UTCV_001_009



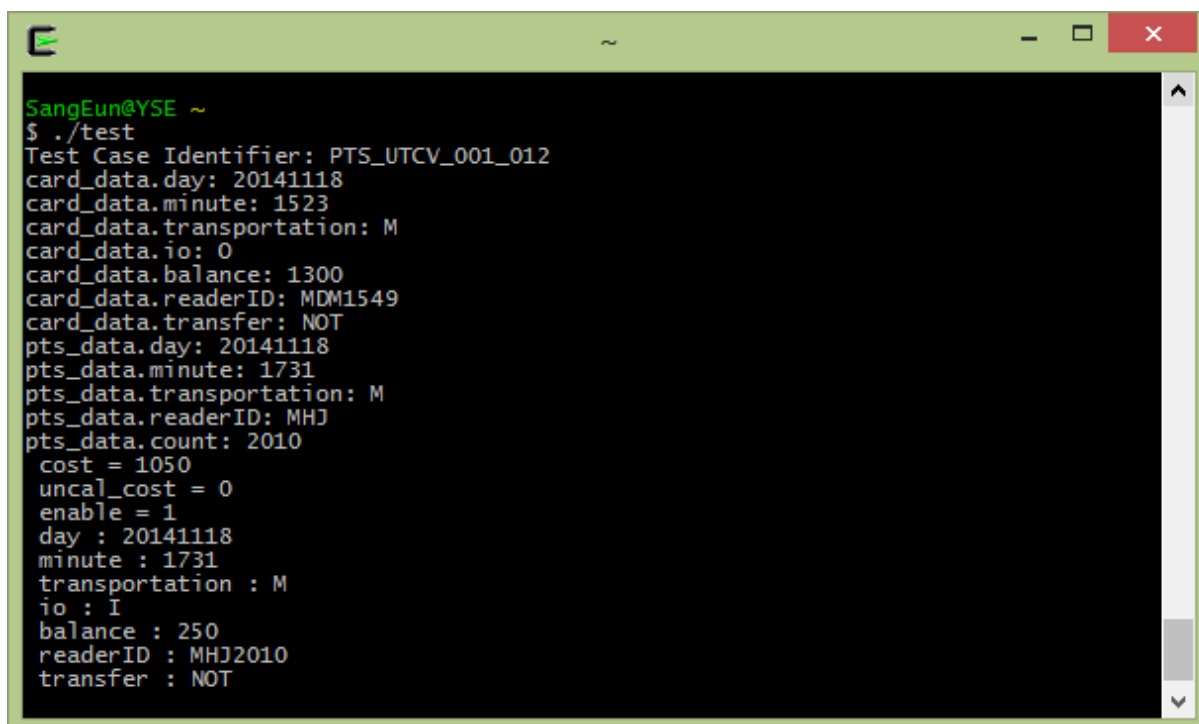
```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_010  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: M  
card_data.io: 0  
card_data.balance: 800  
card_data.readerID: MDM1549  
card_data.transfer: NOT  
pts_data.day: 20141118  
pts_data.minute: 1707  
pts_data.transportation: B  
pts_data.readerID: BUS  
pts_data.count: 3903  
cost = 1050  
uncal_cost = 0  
enable = 0  
day : 20141118  
minute : 1523  
transportation : M  
io : 0  
balance : 800  
readerID : MDM1549  
transfer : NOT
```

PTS_UTCV_001_010



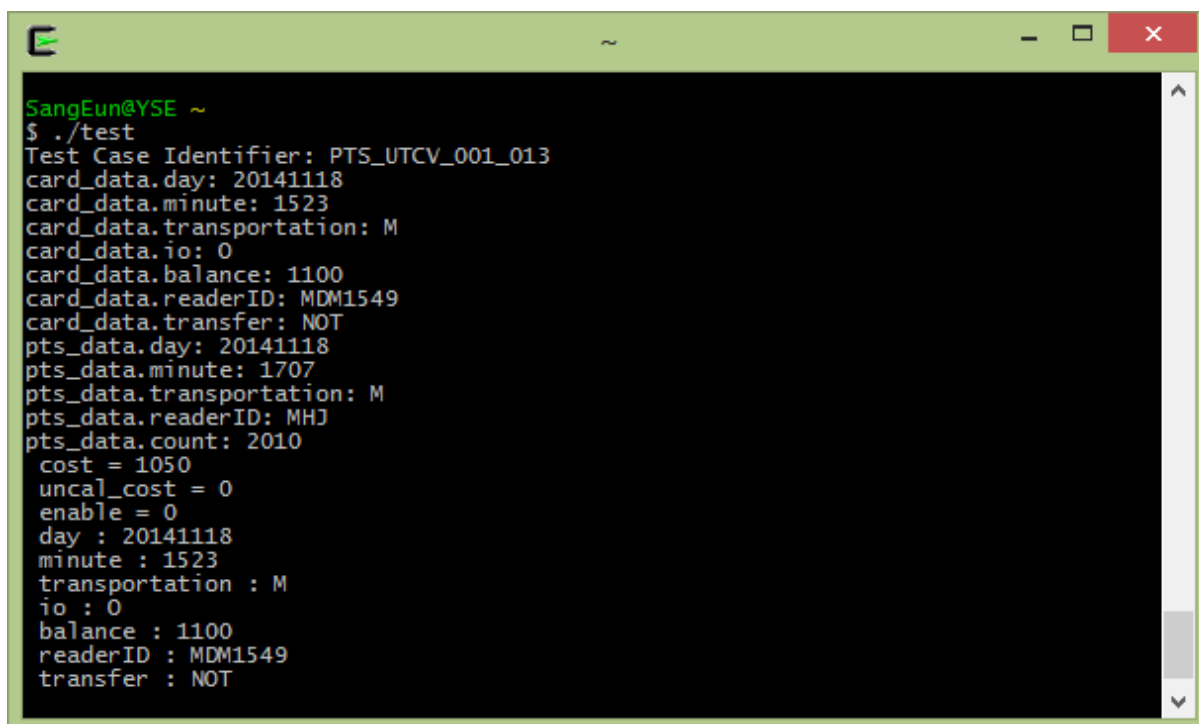
```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_011  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: M  
card_data.io: 0  
card_data.balance: 800  
card_data.readerID: MDM1549  
card_data.transfer: NOT  
pts_data.day: 20141118  
pts_data.minute: 1707  
pts_data.transportation: M  
pts_data.readerID: MHJ  
pts_data.count: 2010  
cost = 1050  
uncal_cost = 0  
enable = 0  
day : 20141118  
minute : 1523  
transportation : M  
io : 0  
balance : 800  
readerID : MDM1549  
transfer : NOT
```

PTS_UTCV_001_011



```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_012  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: M  
card_data.io: 0  
card_data.balance: 1300  
card_data.readerID: MDM1549  
card_data.transfer: NOT  
pts_data.day: 20141118  
pts_data.minute: 1731  
pts_data.transportation: M  
pts_data.readerID: MHJ  
pts_data.count: 2010  
cost = 1050  
uncal_cost = 0  
enable = 1  
day : 20141118  
minute : 1731  
transportation : M  
io : I  
balance : 250  
readerID : MHJ2010  
transfer : NOT
```

PTS_UTCV_001_012



```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_013  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: M  
card_data.io: 0  
card_data.balance: 1100  
card_data.readerID: MDM1549  
card_data.transfer: NOT  
pts_data.day: 20141118  
pts_data.minute: 1707  
pts_data.transportation: M  
pts_data.readerID: MHJ  
pts_data.count: 2010  
cost = 1050  
uncal_cost = 0  
enable = 0  
day : 20141118  
minute : 1523  
transportation : M  
io : 0  
balance : 1100  
readerID : MDM1549  
transfer : NOT
```

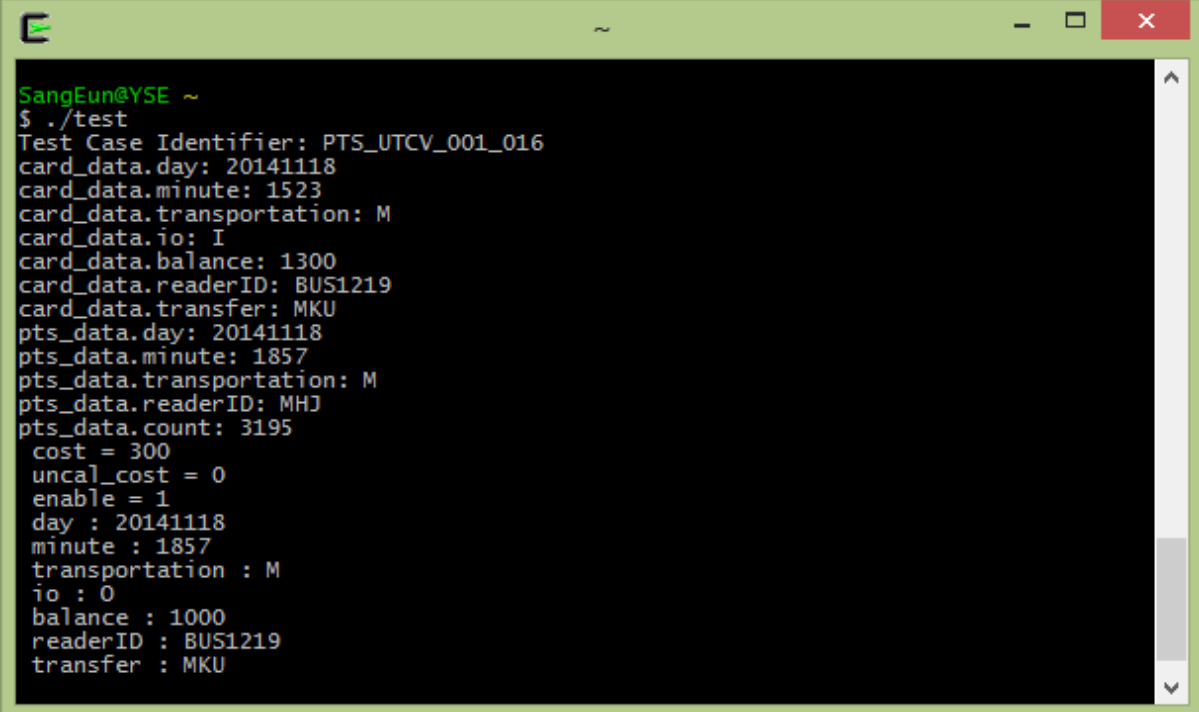
PTS_UTCV_001_013

```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_014  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: M  
card_data.io: I  
card_data.balance: 1700  
card_data.readerID: BUS2178  
card_data.transfer: MDM  
pts_data.day: 20141119  
pts_data.minute: 0843  
pts_data.transportation: B  
pts_data.readerID: BUS  
pts_data.count: 0791  
cost = 1050  
uncal_cost = 600  
enable = 1  
day : 20141119  
minute : 0843  
transportation : B  
io : I  
balance : 50  
readerID : BUS0791  
transfer : NOT
```

PTS_UTCV_001_014

```
SangEun@YSE ~  
$ ./test  
Test Case Identifier: PTS_UTCV_001_015  
card_data.day: 20141118  
card_data.minute: 1523  
card_data.transportation: B  
card_data.io: I  
card_data.balance: 1950  
card_data.readerID: MKU4219  
card_data.transfer: BUS  
pts_data.day: 20141118  
pts_data.minute: 1857  
pts_data.transportation: M  
pts_data.readerID: MHJ  
pts_data.count: 3195  
cost = 1050  
uncal_cost = 700  
enable = 1  
day : 20141118  
minute : 1857  
transportation : M  
io : I  
balance : 200  
readerID : MHJ3195  
transfer : NOT
```

PTS_UTCV_001_015

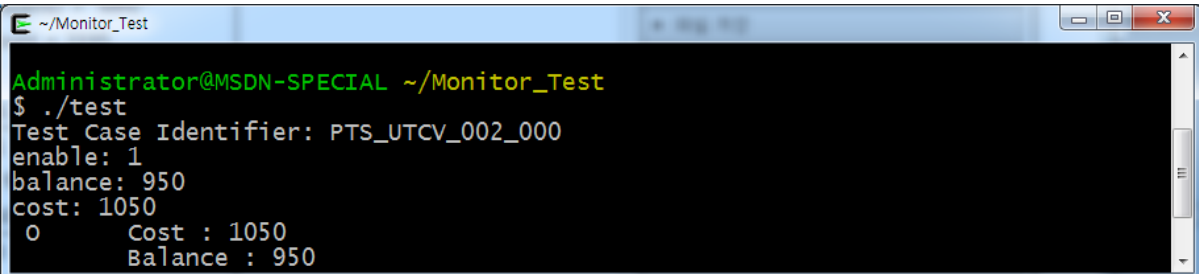


```

SangEun@YSE ~
$ ./test
Test Case Identifier: PTS_UTCV_001_016
card_data.day: 20141118
card_data.minute: 1523
card_data.transportation: M
card_data.io: I
card_data.balance: 1300
card_data.readerID: BUS1219
card_data.transfer: MKU
pts_data.day: 20141118
pts_data.minute: 1857
pts_data.transportation: M
pts_data.readerID: MHJ
pts_data.count: 3195
  cost = 300
  uncal_cost = 0
  enable = 1
  day : 20141118
  minute : 1857
  transportation : M
  io : 0
  balance : 1000
  readerID : BUS1219
  transfer : MKU

```

PTS_UTCV_001_016

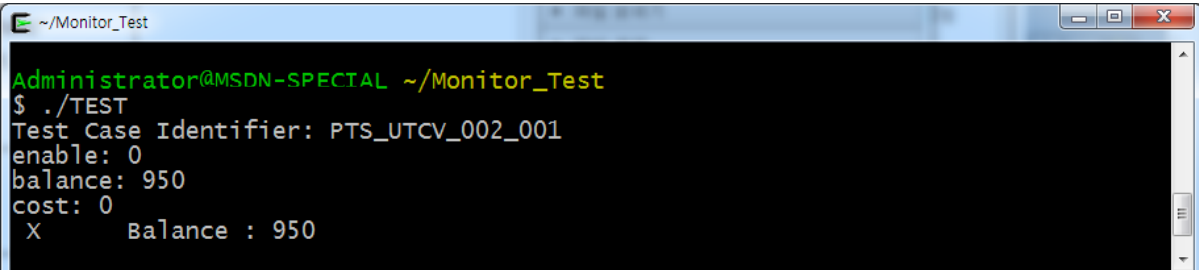


```

Administrator@MSDN-SPECIAL ~/Monitor_Test
$ ./test
Test Case Identifier: PTS_UTCV_002_000
enable: 1
balance: 950
cost: 1050
  0      Cost : 1050
        Balance : 950

```

PTS_UTCV_002_000



```

Administrator@MSDN-SPECIAL ~/Monitor_Test
$ ./TEST
Test Case Identifier: PTS_UTCV_002_001
enable: 0
balance: 950
cost: 0
  X      Balance : 950

```

PTS_UTCV_002_001

```

Administrator@MSDN-SPECIAL ~/Card_test
$ ./TEST
Test Case Identifier: PTS_UTCV_003_000
card_data.day: 20141118
card_data.minute: 1523
card_data.transportation: M
card_data.io: I
card_data.balance: 1950
card_data.readerID: BUS1219
card_data.transfer: MKU
name of txt : 0001
  
```

0001.txt - 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

201411181523 M | 1950 BUS1219 MKU

PTS_UTCV_003_000

```

Administrator@MSDN-SPECIAL ~/Card_test
$ ./TEST
Test Case Identifier: PTS_UTCV_003_001
card_data.day: 20141119
card_data.minute: 813
card_data.transportation: B
card_data.io: I
card_data.balance: 1050
card_data.readerID: BUS0872
card_data.transfer: NOT
name of txt : 0002
  
```

0002.txt - 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

201411190813 B | 1050 BUS0872 NOT

PTS_UTCV_003_001

```

Administrator@MSDN-SPECIAL ~/Card_test
$ ./TEST
Test Case Identifier: PTS_UTCV_003_002
card_data.day: 20141120
card_data.minute: 2349
card_data.transportation: M
card_data.io: I
card_data.balance: 1050
card_data.readerID: MDM1603
card_data.transfer: NOT
name of txt : 0003
  
```

0003.txt - 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

201411202349 M | 1050 MDM1603 NOT

PTS_UTCV_003_002

```

SangEun@YSE ~/sorting
$ ./test
PTS_UTCV_004_000
api_data.day: 20141115
api_data.minute: 1050
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MKU0002
api_data.day: 20141115
api_data.minute: 0824
api_data.transportation: B
api_data.io: 0
api_data.cost: 0
api_readerID: BUS0001
api_data.day: 20141115
api_data.minute: 0432
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0001
api_data.day: 20141115
api_data.minute: 1749
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MDM0001
api_data.day: 20141115
api_data.minute: 1123
api_data.transportation: M
api_data.io: 0
api_data.cost: 200
api_readerID: MKU0002
20141115 824 B O 0 BUS0001
20141115 432 B I 1050 BUS0001
20141115 1749 M I 1050 MDM0001
20141115 1050 M I 1050 MKU0002
20141115 1123 M O 200 MKU0002

```

PTS_UTCV_004_000

```

SangEun@YSE ~/sorting
$ ./test
PTS_UTCV_004_001
api_data.day: 20141116
api_data.minute: 0613
api_data.transportation: M
api_data.io: I
api_data.cost: 1750
api_readerID: MHJ0001
api_data.day: 20141116
api_data.minute: 1326
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0002
api_data.day: 20141116
api_data.minute: 1141
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MGN0001
api_data.day: 20141116
api_data.minute: 2118
api_data.transportation: B
api_data.io: 0
api_data.cost: 0
api_readerID: BUS0002
api_data.day: 20141116
api_data.minute: 0908
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0001
20141116 908 B I 1050 BUS0001
20141116 1326 B I 1050 BUS0002
20141116 2118 B O 0 BUS0002
20141116 1141 M I 1050 MGN0001
20141116 613 M I 1750 MHJ0001

```

PTS_UTCV_004_001

```

SangEun@YSE ~/sorting
$ ./test
PTS_UTCV_004_002
api_data.day: 20141117
api_data.minute: 1038
api_data.transportation: M
api_data.io: O
api_data.cost: 200
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 1407
api_data.transportation: B
api_data.io: I
api_data.cost: 0
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 1939
api_data.transportation: B
api_data.io: I
api_data.cost: 1750
api_readerID: BUS0001
api_data.day: 20141117
api_data.minute: 0821
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 2345
api_data.transportation: B
api_data.io: O
api_data.cost: 0
api_readerID: BUS0001
20141117 1939 B I 1750 BUS0001
20141117 2345 B O 0 BUS0001
20141117 1038 M O 200 MHJ0001
20141117 1407 B I 0 MHJ0001
20141117 821 M I 1050 MHJ0001

```

PTS_UTCV_004_002

```

SangEun@YSE ~/calculate_api
$ ./test
PTS_UTCV_005_000
api_data.day: 20141115
api_data.minute: 0432
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0001
api_data.day: 20141115
api_data.minute: 0824
api_data.transportation: B
api_data.io: O
api_data.cost: 0
api_readerID: BUS0001
api_data.day: 20141115
api_data.minute: 1050
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MKU0002
api_data.day: 20141115
api_data.minute: 1123
api_data.transportation: M
api_data.io: O
api_data.cost: 200
api_readerID: MKU0002
api_data.day: 20141115
api_data.minute: 1749
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MDM0001
total income : 3550, bus company income : 1050, metro company income : 2500

```

PTS_UTCV_005_000

```

SangEun@YSE ~/calculate_api
$ ./test
PTS_UTCV_005_001
api_data.day: 20141116
api_data.minute: 0613
api_data.transportation: M
api_data.io: I
api_data.cost: 1750
api_readerID: MHJ0001
api_data.day: 20141116
api_data.minute: 0908
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0001
api_data.day: 20141116
api_data.minute: 1141
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MGN0001
api_data.day: 20141116
api_data.minute: 1326
api_data.transportation: B
api_data.io: I
api_data.cost: 1050
api_readerID: BUS0002
api_data.day: 20141116
api_data.minute: 2118
api_data.transportation: B
api_data.io: 0
api_data.cost: 0
api_readerID: BUS0002
total income : 5300, bus company income : 2100, metro company income : 3200

```

PTS_UTCV_005_001

```

SangEun@YSE ~/calculate_api
$ ./test
PTS_UTCV_005_002
api_data.day: 20141117
api_data.minute: 1038
api_data.transportation: M
api_data.io: 0
api_data.cost: 200
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 0821
api_data.transportation: M
api_data.io: I
api_data.cost: 1050
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 1407
api_data.transportation: B
api_data.io: I
api_data.cost: 0
api_readerID: MHJ0001
api_data.day: 20141117
api_data.minute: 1939
api_data.transportation: B
api_data.io: I
api_data.cost: 1750
api_readerID: BUS0001
api_data.day: 20141117
api_data.minute: 2345
api_data.transportation: B
api_data.io: 0
api_data.cost: 0
api_readerID: BUS0001
total income : 3700, bus company income : 2938, metro company income : 761

```

PTS_UTCV_005_002

```
Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h -o
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI_000_000
cost = 1050
uncal_cost = 700
enable = 0
day : 840713
minute : 1523
transportation : B
io : I
balance : 1950
readerID : MHJ3195
transfer : NOT
```

PTS_UTCI_000_000

```
Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI_000_001
cost = 1050
uncal_cost = 700
enable = 0
day : 141118
minute : 0123
transportation : B
io : I
balance : 1950
readerID : MHJ3195
transfer : NOT
```

PTS_UTCI_000_001

```
Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h -o
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI_000_002
cost = 1050
uncal_cost = 700
enable = 0
day : 141118
minute : 2785
transportation : B
io : I
balance : 1950
readerID : MHJ3195
transfer : NOT
```

PTS_UTCI_000_002

```

Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h -o
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI
cost = 1050
uncal_cost = 700
enable = 0
day : 141118
minute : 1523
transportation : B
io : I
balance : -1294967296
readerID : MHJ3195
transfer : NOT

```

PTS_UTCI_000_003

```

Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h -o
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI
cost = 1050
uncal_cost = 700
enable = 0
day : 141118
minute : 1523
transportation : B
io : I
balance : 1950
readerID : MHJ31950NOT
transfer : NOT

```

PTS_UTCI_000_004

```

Administrator@MSDN-SPECIAL ~/test
$ gcc Decision_controller.c pts.h sharing_api_data.h -o
Administrator@MSDN-SPECIAL ~/test
$ ./PTS_UTCI
cost = 1050
uncal_cost = 700
enable = 0
day : 141119
minute : 1523
transportation : B
io : I
balance : 1950
readerID : MHJ3195
transfer : NOT

```

PTS_UTCI_000_005

6.2 Evaluation

Test : 37개

Pass : 31개

Failed: 6개(invalid 한 값들에 대해)