UCP Report

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Contents

1 Purpose of Functions

```
void collectAndLog ( FILE file, map items, explorer person,
    ↪ unsigned long i, unsigned long j )
```

Collects the treasure at the given location. Logs this event to a file. **Parameters** `file` File to log information to. `items` Map containing item to collect. `person` Explorer to collect the item. `i` y location of the treasure to collect. `j` x location of the treasure to collect. **Precondition** file must be opened in "a" mode. **Postcondition** The treasure in items is either swapped, destroyed (and deallocated), or retained. **Implementation:** Switch on the type of the treasure. coin: Deallocate and increase explorer.coin by treasure::value. magic: Deallocate and increase explorer.magic by treasure::value. gear: Use treasure::compare to compare and conditionally swap the two treasures. Log with logTreasure if any deallocation or swapping occured.

2 Conversion of Input File to Coordinate System

2.1 Implementation

The top level function to convert the input file is read_map. This function opens the file, reads and validates the map size (rows and columns), and uses allocate_map to allocate memory for the map.

Once this is done, fill_map is called. This function parses the file line by line, and reads values into the map. First, read_line is called. This function reads a line of arbitrary size by reallocating larger buffers until the line is read in full. This means that the map can be as large as the user wants. Once the line is read, it is split into tokens using split. This function iterates over the provided string, finds a given delimiter (',' in this case) with strchr, and substitutes it will a null-terminator. It then exports an array filled with pointers to the start of each token. This has the effect of breaking a string up into many substrings, seperated by the delimiter.

Once this is done, each individual token is passed to make_treasure. This function uses a switch statement on the first character to determine the type of the treasure. Once the type is determined, the treasure is usually parsed by finding the colon character(s) with strchr, and either using strncpy or sscanf to parse each section. In the case of a gear treasure, the function chooseCompareFunc is used to determine which function pointer should be used with the given slot.

2.2 Alternate Implementation

An alternate approach would be to either use strtok, or the given tokenizer, to parse each line. This would mean that make_treasure would be passed tokens

one at a time, rather than splitting the entire string and then passing all tokens to make_treasure. This method was not chosen, as strtok ignores repeated characters and is therefore unsuitable for any empty sections of the map. strtok could also be used to parse individual treasures, instead of using strchr.

3   Sample Input and Output

All test results are generated from the TreasureHunter binary. This is called with the arguments:

```
    ./TreasureHunter <map file> <list file>
```

A script to run these tests is located in test/all_tests.sh. There is no user input for any test cases. If example output from adventure.log is not provided, it should be assumed that the binary does not provide log file output for that test case.

The TreasureHunterLog binary will produce the same output as the TreasureHunter binary, except any output to the log file (adventure.log) is also output to stdout. This is done real time; as lines are printed to the log file, the same content is printed to stdout.

The TreasureHunterAI binary is assumed to produce the same output as the TreasureHunter binary, unless otherwise stated.

3.1   Example Input from Assignment Brief

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
STATUS: COMPLETE
COINS: 50
MAGIC: 445
GEAR: 990
```

Log file

```
---
COLLECT<ITEM:MAGIC, XLOC:2, YLOC:0, DESCRIPTION:Healing Potion,
    ↪ VALUE:85>
COLLECT<ITEM:MAGIC, XLOC:2, YLOC:2, DESCRIPTION:Defence
    ↪ Enchantment, VALUE:360>
COLLECT<ITEM:GEAR, XLOC:4, YLOC:2, DESCRIPTION:Lightsaber, SLOT:
    ↪ hands, VALUE:850>
COLLECT<ITEM:GEAR, XLOC:1, YLOC:1, DESCRIPTION:Vibranium Shield,
    ↪ SLOT:hands, VALUE:990>
DISCARD<ITEM:GEAR, XLOC:1, YLOC:1, DESCRIPTION:Lightsaber, SLOT:
    ↪ hands, VALUE:850>
COLLECT<ITEM:COINS, XLOC:1, YLOC:3, VALUE:50>
```

3.2   Out of Bounds

3.2.1   TreasureHunter

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
LEFt 3
RIGHT 1
down 2
LEfT 5
RIGHT 20
left 1
DOWN 100
UP 2000
```

stdout

```
STATUS: FAILED
```

Log file

```
---
```

3.2.2 TreasureHunterAI

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
LEFt 3
RIGHT 1
down 2
LEfT 5
RIGHT 20
left 1
DOWN 100
UP 2000
```

```
STATUS: CORRECTED
COINS: 0
MAGIC: 736
GEAR: 32031
```

Log file

```
---
COLLECT<ITEM:GEAR, XLOC:0, YLOC:1, DESCRIPTION:Thorn armour, SLOT
    ↪ :chest, VALUE:120>
COLLECT<ITEM:GEAR, XLOC:1, YLOC:1, DESCRIPTION:Vibranium Shield,
    ↪ SLOT:hands, VALUE:990>
COLLECT<ITEM:MAGIC, XLOC:2, YLOC:0, DESCRIPTION:Healing Potion,
    ↪ VALUE:85>
COLLECT<ITEM:MAGIC, XLOC:2, YLOC:2, DESCRIPTION:Defence
    ↪ Enchantment, VALUE:360>
COLLECT<ITEM:MAGIC, XLOC:3, YLOC:1, DESCRIPTION:Phoenix Blood,
    ↪ VALUE:291>
COLLECT<ITEM:GEAR, XLOC:4, YLOC:1, DESCRIPTION:IDEK_ANYMORE, SLOT
    ↪ :head, VALUE:21>
COLLECT<ITEM:GEAR, XLOC:5, YLOC:1, DESCRIPTION:Crimson Plate,
    ↪ SLOT:chest, VALUE:1020>
DISCARD<ITEM:GEAR, XLOC:5, YLOC:1, DESCRIPTION:Thorn armour, SLOT
    ↪ :chest, VALUE:120>
COLLECT<ITEM:GEAR, XLOC:6, YLOC:1, DESCRIPTION:Infinity Pants,
    ↪ SLOT:legs, VALUE:30000>
```

3.3   Empty List

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
File <list file> was empty.
```

3.4   Invalid Direction

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
LEFT 3
riGhtt 1
DOWN 2
LEFT 5
RIGHT 20
NOrtH 1
DOWN 100
UP 2000
```

```
Invalid direction
At line 2.
```

3.5   Invalid Distance

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
DOWN 2
RIGHT 2
DOWn %s
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Distance must be an integer
At line 3.
```

3.6   No Space in List

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT1
UP 3
riGHT 0
RIGHT 1
```

```
No space
At line 5.
```

3.7   Negative Distance

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT -100
```

```
Distance must be positive
At line 8.
```

3.8 Floating Point Distance

Map

```
5,4
,,C 200,
,G Vibranium Shield:hands:990,,C 50
M Healing Potion:85,,M Defence Enchantment:360,
,,,
,,G Lightsaber:hands:850,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0.5
RIGHT 100
```

stderr

```
Distance must be an integer
At line 7.
```

3.9   Empty Map

Map

```

```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting in <map file>, line 1: Expected positive
    ↪ integers <rows>,<cols>
```

3.10   Incorrect Rows

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect number of rows: read 6, expected 7.
```

3.11   Incorrect Columns

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect number of columns at line 7: expected 3.
```

3.12   Negative Columns

Map

```
7,-3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting in <map file>, line 1: Expected positive
    ↪ integers <rows>,<cols>
```

3.13   Invalid Rows

Map

```
7.5,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting in <map file>, line 1: Expected positive
    ↪ integers <rows>,<cols>
```

3.14   Invalid Treasure Type

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,f Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
F is not a valid treasure type.
At row 5, column 3.
```

3.15   Invalid Slot

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G bow and arrows:feet:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting. Gear is represented as: "G <detail>:<slot
    ↪ >:<value>"
At row 5, column 3.
```

3.16   Invalid Value

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:99.5,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting. Gear is represented as: "G <detail>:<slot
    ↪ >:<value>"
At row 2, column 2.
```

3.17   Too Many Colons

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing:Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting. Magic items are represented as: "M <detail
    ↪ >:<value>"
At row 3, column 1.
```

3.18   Too Little Colons

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
M Healing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

```
Incorrect formatting. Gear is represented as: "G <detail>:<slot
    ↪ >:<value>"
At row 7, column 2.
```

3.19   No Space in Map

Map

```
7,3
,g Thorn armour:CheST:120,C 200
,G Vibranium Shield:hands:990,
MHealing Potion:85,,M Defence Enchantment:360
,m Phoenix Blood:291,
,g IDEK_ANYMORE:heaD:21,G Lightsaber:hAnDs:850
c 350,g Crimson Plate:cHeSt:1020,
,G Infinity Pants:leGS:30000,
```

List

```
DOWN 2
RIGHT 2
DOWn 2
up 0
LEFT 1
UP 3
riGHT 0
RIGHT 2
```

stderr

```
Incorrect formatting. Magic items are represented as: "M <detail
    ↪ >:<value>"
At row 3, column 1.
```