

TableToLongForm

Literate Program

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Abstract

TableToLongForm automatically converts hierarchical Tables intended for a human reader into a simple LongForm Dataframe that is machine readable. It does this by recognising positional cues present in the hierarchical Table (which would normally be interpreted visually by the human brain) to decompose, then reconstruct the data into a LongForm Dataframe. This is the Literate Program for TableToLongForm and contains the entirety of the code with accompanying documentation.

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On Literate Programs

This software is presented as a *literate program* written in the *noweb* format ([Ramsey 1994](#)). It serves as both the documentation and container of the literate program. The *noweb* file can be used to produce both the *literate document* and the executable code.

The literate document is separated into *documentation chunks* and named *code chunks*. Each *code chunk* can contain code directly, or contain references to other *code chunks* which act as placeholders for the contents of the respective *code chunk*. The name of each *code chunk* should serve as a short description of the code it contains. Thus each *code chunk* provides an overview of its purpose by either directly containing code, or by containing the names of other *code chunks*. The reader is then free to delve deeper into the respective *code chunks* if desired.

1 Introduction

lorem ipsum

2 Code Overview

Unless the Table is horrible beyond mortal imagination, it should have some kind of pattern, such that a human will be able to discern the structure and hence understand the data it represents. This code attempts to algorithmically search for such patterns, discern the structure, then reconstruct the data into a LongForm Dataframe.

The task can be seen to consist of three phases:

- Phase One is Identification, which involves identifying the rows and columns where the labels and the data can be found.
- Phase Two is Discerning the Parentage, which involves identifying the hierarchical structure of the data, based on the row and column labels.
- Phase Three is Reconstruction, where we use what we've found in the first two phases to reconstruct the data into a LongForm Dataframe.

3a $\langle \text{TableToLongForm.R } 3a \rangle \equiv$
 $\langle \text{document header } 3b \rangle$
 $\langle \text{Front End } 4a \rangle$
 $\langle \text{Back End } 5b \rangle$
 $\langle \text{Identification } 9a \rangle$
 $\langle \text{Discern Parentage } 15a \rangle$
 $\langle \text{Reconstruction } 25a \rangle$

This code is written to file `TableToLongForm.R`.

We place a document header at the top of the extracted code to encourage people to read the literate description rather than attempting to study the code alone.

3b $\langle \text{document header } 3b \rangle \equiv$
 ##-----
 ## The code in this .R file is machine generated from the literate
 ## program, TableToLongForm.Rnw
 ## Documentation can be found in the literate description for this
 ## program, TableToLongForm.pdf
 ##-----

2.1 Front End

The main function `TableToLongForm` is defined here. For most users this is the only function they will call. The arguments are as follows:

Table the Table to convert, given as a `character` matrix. Also accepts a `data.frame`, which is coerced to a `matrix` with a warning.

IdentResult an optional `list` specifying the locations of the various elements of the Table. By default this is automatically generated but it can be specified manually where the automatic detection fails.

fulloutput if `TRUE`, returns a `list` containing additional information primarily useful for diagnostic purposes. Otherwise, and by default, the function only returns the converted `data.frame` object.

diagnostics a `character` vector specifying the name of the file diagnostic output will be written to. Can also be `TRUE`, in which case the file name will be the name of the object specified in `Table`.

This function handles some busy-work, such as coercing the `Table` to a `matrix` (with a warning) and setting up the diagnostics output file. It then calls `ReconsMain` which handles the real meat of the conversion.

In the package version of `TableToLongForm`, this is the only function that is exported, the rest are hidden in the package namespace (which is still accessible, just not as easily). If sourcing in the raw `.R` file, the majority of the supporting functions are not hidden and can be accessed directly from the Global Environment.

```
4a  <Front End 4a>≡
    TableToLongForm =
      function(Table, IdentResult = NULL,
                IdentPrimary = "combound",
                IdentAuxiliary = "sequence",
                ParePreRow = NULL,
                ParePreCol = c("mismatch", "misalign", "multirow"),
                fulloutput = FALSE,
                diagnostics = FALSE, diagnostics.trim = TRUE){
        <Check Table arg 4b>
        <Setup diagnostics file 5a>
        fullout = ReconsMain(matFull = Table, IdentResult,
                              IdentPrimary, IdentAuxiliary, ParePreRow, ParePreCol)
        if(fulloutput) fullout else fullout$datafr
      }

    Uses IdentResult 26a and ReconsMain 25b.

4b  <Check Table arg 4b>≡
    if(is.data.frame(Table)){
      warning("Table supplied is a data.frame.\n",
              "TableToLongForm is designed for a character matrix.\n",
              "The data.frame is being coerced to a matrix but this\n",
              "may lead to unexpected results.",
              immediate. = TRUE)
      Table = as.matrix(Table)
    }
    if(!is.matrix(Table))
      stop("Table argument must be a matrix or a data.frame")
```

```

5a  <Setup diagnostics file 5a>≡
      if(diagnostics != FALSE){
        if(!is.character(diagnostics))
          diagnostics = deparse(substitute(Table))
        assign("TCRunout", file(paste0(diagnostics, ".TCRunout"), "w"),
              envir = TTLFBaseEnv)
        assign("TCtrim", diagnostics.trim, envir = TTLFBaseEnv)
        on.exit({
          with(TTLFBaseEnv, {
            close(TCRunout)
            rm(TCRunout)
            rm(TCtrim)
          })
        })
      }

```

Uses TTLFBaseEnv 7.

2.2 Back End

Various code, mainly to help produce diagnostic output, can be ignored by most users.

```

5b  <Back End 5b>≡
      <BErbinddf 5c>
      <BEprintplist 6a>
      <BEattrLoc 6b>
      <BETCRsink 7>
      <BETTLFalias 8>

```

rbinddf An `rbind` method to handle `data.frames` with differing column names. Does not check if arguments are actually `data.frames`, so can break easily.

```

5c  <BErbinddf 5c>≡
      rbinddf =
        function(..., deparse.level = 0){
          bindlist = list(...)
          nameunion = NULL
          for(j in 1:length(bindlist))
            nameunion = union(nameunion, colnames(bindlist[[j]]))
          for(j in 1:length(bindlist)){
            curdf = bindlist[[j]]
            namediff = setdiff(nameunion, colnames(curdf))
            matdummy = matrix(NA, nrow = nrow(curdf), ncol = length(namediff),
                              dimnames = list(NULL, namediff))
            bindlist[[j]] = cbind(curdf, matdummy)
          }
          outdf = do.call(rbind,
            c(bindlist, list(deparse.level = deparse.level)))
          for(j in 1:ncol(outdf))
            if(mode(outdf[,j]) == "character") outdf[,j] = factor(outdf[,j])
          outdf
        }

```

Defines:

`rbinddf`, used in chunk 29b.

print.plist A print method for class **plist**, which are nested lists with a numeric vector at the lowest level; **print.default** is rather inefficient in displaying such nested lists.

6a $\langle BEprintplist\ 6a \rangle \equiv$

```

print.plist =
function(x, ...){
  plistC = function(plist){
    pLoc = attr(plist, "Loc")
    if(is.list(plist)){
      namevec = names(plist)
      if(!is.null(pLoc))
        namevec = paste0(names(plist),
          " (", pLoc[,"rows"], ", ", pLoc[,"cols"], ")")
      namelist = as.list(namevec)
      for(i in 1:length(namelist))
        namelist[[i]] =
          c(paste("+", namelist[[i]]),
            paste("-", plistC(plist[[i]])))
      do.call(c, namelist)
    } else{
      if(!is.null(names(plist))){
        namevec = names(plist)
        if(!is.null(pLoc))
          namevec = paste0(names(plist),
            " (", pLoc[,"rows"], ", ", pLoc[,"cols"], ")")
        paste("+", namevec)
      } else paste(plist, collapse = " ")
    }
  }

  cat(plistC(x), sep = "\n")
}

```

attrLoc A function for creating a **plist** object and binding location information (rows and cols) to it.

6b $\langle BEattrLoc\ 6b \rangle \equiv$

```

attrLoc =
function(plist, rows = NULL, cols = NULL){
  attr(plist, "Loc") = cbind(rows, cols)
  class(plist) = "plist"
  plist
}

```

Defines:

attrLoc, used in chunks 20 and 22–24.

TCRsink Sinks the output to TCR_{runout} for diagnostic output. Requires the existence of TCR_{runout} which is created by the main function `TableToLongForm` when `diagnostics = TRUE`.

Spaces may be introduced by `match.call`, thus any spaces in the args of *variables to sink* (that is, the arguments supplied via `...`) are removed without warning.

We also create the `TTLFBaseEnv` here, which is currently only used to temporarily store TCR_{runout}.

```
7  <BETCRsink 7>≡
    TCRsink =
      function(ID, ...)
      if(exists("TCRunout", envir = TTLFBaseEnv)){
        varlist = list(...)
        names(varlist) = gsub(" ", "", as.character(match.call()[-(1:2)]))
        TCtrim = get("TCtrim", envir = TTLFBaseEnv)
        with(TTLFBaseEnv, sink(TCRunout))
        for(i in 1:length(varlist)){
          cat("###TCR", ID, names(varlist)[i], "\n")
          curvar = varlist[[i]]
          if(TCtrim == TRUE){
            curvar = head(curvar)
            if(is.matrix(curvar) || is.matrix(curvar))
              if(ncol(curvar) > 6)
                curvar = curvar[,1:6]
          }
          print(curvar)
        }
        sink()
      }
    TTLFBaseEnv = new.env()
```

Defines:

TCRsink, used in chunks 10, 16–18, 20, 22–24, 26b, 27, and 30.
 TTLFBaseEnv, used in chunks 5a and 8.

TTLFalias Should add a check to aliasAdd for existing rows with same alias (and same Type, probably ok to allow same alias for different Types).

```

8  <BETTLFalias 8>≡
    with(TTLFBaseEnv, {aliasmat = NULL})
    TTLFaliasAdd =
      function(Type, Fname, Falias, Author = "", Description = "")
      assign("aliasmat",
        rbind(get("aliasmat", envir = TTLFBaseEnv),
          c(Type = Type, Name = Fname, Alias = Falias,
            Author = Author, Description = Description)),
        envir = TTLFBaseEnv)

    TTLFaliasGet =
      function(Type, Falias){
        aliasmat = get("aliasmat", envir = TTLFBaseEnv)
        matchRow = which(aliasmat[, "Type"] == Type &
          aliasmat[, "Alias"] == Falias)
        if(length(matchRow) == 1)
          aliasmat[matchRow, "Name"]
        else stop("Invalid algorithm specified for ", Type)
      }

    TTLFaliasList =
      function(){
        aliasmat = get("aliasmat", envir = TTLFBaseEnv)
        Types = unique(aliasmat[, "Type"])
        for(Type in Types){
          cat("==Type: ", Type, "==" , sep = "")
          Algos = aliasmat[aliasmat[, "Type"] == Type, , drop=FALSE]
          for(i in 1:nrow(Algos))
            cat("Name: ", Algos[i, "Name"], "\n",
              "Alias: ", Algos[i, "Alias"], "\n",
              "Author: ", Algos[i, "Author"], "\n",
              "Description: ", Algos[i, "Description"], "\n\n",
              sep = "")
        }
      }

```

Defines:

TTLFaliasAdd, used in chunks 9c, 12a, 16, and 18.

TTLFaliasGet, used in chunks 26 and 27.

Uses TTLFBaseEnv 7.

3 Identification

The purpose of **Identification** is to identify where in the Table the data is found and where the accompanying labels are, while ignoring any extraneous information we do not want. The output is the **IdentResult**, a list containing two elements, **rows** and **cols**, each of which is a list containing these two elements:

label - a vector of the rows or columns where the labels are found.

data - a vector of the rows or columns where the data are found.

It is intended for this procedure to involve a number of Identification algorithms that are used for a high degree of reliability and flexibility, but at this stage there is only a single Primary algorithm, supplemented by a single Auxiliary algorithm.

We separate the Identification functions into three groups.

Ident Primary contain Primary Ident algorithms, of which one is chosen when calling **TableToLongForm**.

Ident Auxiliary contain Auxiliary Ident algorithms, of which any combination, in any order, can be chosen when calling **TableToLongForm**. They are called after the Primary algorithm, to refine the **IdentResult**.

Ident Support contains supporting functions called by the Primary and Auxiliary functions.

9a $\langle \text{Identification } 9a \rangle \equiv$
 $\langle \text{Ident Primary } 9b \rangle$
 $\langle \text{Ident Auxiliary } 11b \rangle$
 $\langle \text{Ident Support } 12d \rangle$

3.1 Identification - Primary

The Primary Ident algorithms should take a single argument, **matFull**. They should return an **IdentResult**.

9b $\langle \text{Ident Primary } 9b \rangle \equiv$
 $\langle \text{Ident by Most Common Boundary } 9c \rangle$

3.1.1 Ident by Most Common Boundary

Search for the most common start and end rows and columns (the boundary) to find a block (rectangular region) of numbers, which is assumed to be our table of data.

9c $\langle \text{Ident by Most Common Boundary } 9c \rangle \equiv$
 IdentbyMostCommonBoundary =
 function(matFull){
 $\langle \text{Get Non empty rows and cols } 9d \rangle$
 $\langle \text{Call Ident MostCommonBoundary } 10a \rangle$
 $\langle \text{Construct rowslist and colslist } 10b \rangle$
 $\langle \text{Cleanup MostCommonBoundary Results } 11a \rangle$
 list(rows = rowslist, cols = colslist)
 }
 TTLFaliasAdd("IdentPrimary", "IdentbyMostCommonBoundary", "combound",
 "Base Algorithm", "Default IdentPrimary algorithm")

Uses **TTLFaliasAdd** 8.

9d $\langle \text{Get Non empty rows and cols } 9d \rangle \equiv$
 rowNonempty = (1:nrow(matFull))[IdentNonEmpty(matFull, 1)]
 colNonempty = (1:ncol(matFull))[IdentNonEmpty(matFull, 2)]

Uses **IdentNonEmpty** 13a.

```

10a  <Call IdentMostCommonBoundary 10a>≡
      rowData = IdentMostCommonBoundary(matFull1, 2)
      colData = IdentMostCommonBoundary(matFull1, 1)
      TCRsink("CIMCB", rowData, colData)

```

Uses IdentMostCommonBoundary 14b and TCRsink 7.

Example values for **ToyExComplete.csv** (ID: CIMCB)

```

> rowData
[1] 5 14

> colData
[1] 4 11

```

We construct the interim **rowslist** taking every non-empty row before the most common start of the numbers block (**rowData[1]**) and assigning these to the **label** region. The numbers block (which is bounded by **rowData[1]** and **rowData[2]**) is assigned to the **data** region. The interim **colslist** is constructed in the same manner.

```

10b  <Construct rowslist and colslist 10b>≡
      rowslist = list(label = rowNonempty[rowNonempty < rowData[1]],
                      data = rowNonempty[(rowNonempty >= rowData[1]) &
                                         (rowNonempty <= rowData[2])])
      colslist = list(label = colNonempty[colNonempty < colData[1]],
                      data = colNonempty[(colNonempty >= colData[1]) &
                                         (colNonempty <= colData[2])])
      TCRsink("CRAC", rowslist, colslist)

```

Uses TCRsink 7.

Example values for **ToyExComplete.csv** (ID: CRAC)

```
> rowslist
$label
[1] 1 2 3 4

$data
[1] 5 6 7 8 9 10 11 12 13 14

> colslist
$label
[1] 1 2

$data
[1] 4 5 6 7 8 9 10 11
```

As the **MostCommonBoundary** algorithm searches for the data region, it can be conservative with respect to the rows and columns assigned to data. Under most circumstances this causes no problems, but in certain rare cases of mismatched column labels, there are column labels that are outside the data region (that is, the column label is not over the data it is the label of, hence mismatched). To correct for this, we do the following:

1. If `matRowLabel` isn't all empty
2. Shift any fully empty columns on the right to `cols$data`

11a *<Cleanup MostCommonBoundary Results 11a>*≡

```
matRowLabel = matFull[rowslist$data, colslist$label, drop=FALSE]
if(!all(is.na(matRowLabel)) && ncol(matRowLabel) > 1){
  RowLabelNonempty = IdentNonEmpty(matRowLabel, 2)
  if(max(RowLabelNonempty) < ncol(matRowLabel)){
    toshift = (max(RowLabelNonempty) + 1):ncol(matRowLabel)
    colslist$data = c(colslist$label[toshift], colslist$data)
    colslist$label = colslist$label[-toshift]
  }
}
```

Uses `IdentNonEmpty` 13a.

3.2 Identification - Auxiliary

The Auxiliary Ident algorithms should take two arguments, `matFull` and `IdentResult`. They should return an `IdentResult`.

11b *<Ident Auxiliary 11b>*≡
<Ident by Sequence 12a>

3.2.1 Ident by Sequence

Search for fully numeric row labels (e.g. Years) that were misidentified as data, by checking if the numbers follow some fixed sequence. If such a situation is found (result is not NA), we update `IdentResult`. This is intended to be used in conjunction with the *Ident by Most Common Boundary* Primary algorithm, which assumes numbers to be data, and not labels.

Currently the algorithm is conservative, only making the check if the current `matRowLabel` is empty (`ncol = 0`, or all NAs), and only accepting a sequence of fixed difference, with no gaps or jumps, e.g.

- 1 2 3 4, then a sequence
- 1 2 4 5, then not a sequence

12a *Ident by Sequence 12a*≡

```
IdentbySequence =  
  function(matFull, IdentResult)  
  with(IdentResult, {  
    matRowLabel = matFull[rows$data, cols$label]  
    If empty take next column 12b  
    Check if sequence 12c  
  })  
  TTLFaliasAdd("IdentAuxiliary", "IdentbySequence", "sequence",  
    "Base Algorithm", paste("Search for fully numeric row",  
    "labels (e.g. Years) that were misidentified as data"))
```

Uses `IdentResult 26a` and `TTLFaliasAdd 8`.

12b *If empty take next column 12b*≡

```
if(all(is.na(matRowLabel))){  
  cols$label = cols$data[1]  
  cols$data = cols$data[-1]  
  IdentbySequence(matFull, list(rows = rows, cols = cols))  
}
```

Check to see if all diffs are equal, but original values are not. If it is, we have a sequence and we return an updated `IdentResult`.

12c *Check if sequence 12c*≡

```
else{  
  matRowLabel = suppressWarnings(as.numeric(matRowLabel))  
  if(length(unique(matRowLabel)) > 1 &&  
    length(unique(diff(matRowLabel))) == 1)  
    list(rows = rows, cols = cols)  
  else IdentResult  
}
```

Uses `IdentResult 26a`.

3.3 Identification - Support

Here we discuss the supporting functions called by the Primary and Auxiliary functions. Each chunk corresponds to a separate supporting function.

12d *Ident Support 12d*≡

```
Ident Non Empty 13a  
Ident Pattern 13b  
Ident Most Common Boundary 14b
```

3.3.1 IdentNonEmpty

Given a matrix (`mat`) and a margin (1 for rows, 2 for columns), return a vector giving the indices of non-empty rows or columns. Can specify a different empty identifying function (default `is.na`). Procedure:

1. Compute `isnonempty`, a logical vector about whether the rows or cols are not empty.
2. Use `which` on `isnonempty` to get indices.

```
13a  <Ident Non Empty 13a>≡
      IdentNonEmpty =
        function(mat, margin, emptyident = is.na){
          isnonempty = apply(mat, margin, function(x) !all(emptyident(x)))
          which(isnonempty)
        }
```

Defines:

`IdentNonEmpty`, used in chunks [9d](#), [11a](#), and [16a](#).

3.3.2 IdentPattern

Attempt to discern a repeating pattern in `vec`, which can be a vector of any type (which is coerced to `character`). The returned value is the grouping number for the repeating pattern, or the length of `vec` if there is no repeating pattern, e.g.

- `vec = 1 1 1 1`, then return 1
- `vec = 3 4 3 4`, then return 2
- `vec = 1 2 3 4`, then return 4
- `vec = 1 2 3 1`, then return 4

`IdentPattern` does this fairly efficiently by use of regular expressions and `match`.

```
13b  <Ident Pattern 13b>≡
      IdentPattern =
        function(vec){
          <Look for potential repeat 13c>
          <Check if pattern repeats 14a>
        }
```

Defines:

`IdentPattern`, used in chunk [17a](#).

Look for when unique values of `vec` repeat, and see if the distance (`diff`) between these are equal (hence the `unique` of the `diff` result will be of length 1). If it is, we take this as our potential repeating point and move on.

If the value does not repeat at all, `diff` will return a `vector` of length 0, which is adjusted to the length of `vec`.

```
13c  <Look for potential repeat 13c>≡
      matchvec = match(vec, unique(vec))
      for(i in 1:length(unique(matchvec))){
        repind = unique(diff(which(matchvec == i)))
        if(length(repind) == 0)
          repind = length(vec)
        if(length(repind) == 1)
          break
      }
```

We combine the first `repind` elements of `vec` and collapse this into a single string. A `grep` is then called on the entire `vec` that has also been collapsed into a single string, checking to see if the entire string can be matched to some repeat of the aforementioned collapsed string of the first `repind` elements. If it can, we have a repeating pattern and thus return `repind`. Otherwise, we return the length of `vec`.

14a *<Check if pattern repeats 14a>*≡

```
curseg = paste0("^(", paste(vec[1:repind], collapse = ""), ")+$")
if(length(grep(curseg, paste(vec, collapse = ""))) > 0)
  repind else length(vec)
```

3.3.3 IdentMostCommonBoundary

Search for the most common first and last rows/cols to identify a block (rectangular region) of numbers. Procedure:

1. Suppose `margin = 2`, then loop through each column and search for cells containing numbers.
2. Compute the first row with a number for each column (`nstarts`), and do the same for the last row (`nends`).
3. Return the most common first and last rows.

14b *<Ident Most Common Boundary 14b>*≡

```
IdentMostCommonBoundary =
function(matFull, margin){
  isnumber = suppressWarnings(apply(matFull, margin,
    function(x) which(!is.na(as.numeric(x)))))
  nstarts = table(sapply(isnumber,
    function(x) if(length(x) > 0) min(x) else NA))
  nends = table(sapply(isnumber,
    function(x) if(length(x) > 0) max(x) else NA))
  as.numeric(names(c(which.max(nstarts), which.max(rev(nends))))))
}
```

Defines:

`IdentMostCommonBoundary`, used in chunk 10a.

4 Discern Parentage

The purpose of **Discern Parentage** is to understand the hierarchical structure (the *parentage*) of the row and column labels. The output will be the **rowlist** and **colplist**, the row and column parentage lists. TO DO explanation of plist.

We separate the Parentage functions into five groups.

Pare Pre Row contain pre-requisite algorithms that tidy up the Row Labels for correct operation of the Main Parentage algorithm. Any combination of these algorithms, in any order, can be chosen when calling **TableToLongForm**. The current implementation of **TableToLongForm** has no Pre Row algorithms.

Pare Pre Col contain pre-requisite algorithms that tidy up the Column Labels for correct operation of the Main Parentage algorithm. Any combination of these algorithms, in any order, can be chosen when calling **TableToLongForm**.

Pare Front is a simple ‘front-end’ function that makes the appropriate first call to **PareMain**.

Pare Main contains the Main algorithm that will recursively call itself until the all parentage is discerned.

Pare Low Level contains low-level functions called by the Main function.

15a $\langle \text{Discern Parentage 15a} \rangle \equiv$
 $\langle \text{Pare Pre Row 15b} \rangle$
 $\langle \text{Pare Pre Col 15c} \rangle$
 $\langle \text{Pare Front 19a} \rangle$
 $\langle \text{Pare Main 19b} \rangle$
 $\langle \text{Pare Low Level 21c} \rangle$

4.1 Parentage - Pre Row

Parentage Pre Row algorithms should take two arguments, **matData** and **matRowLabel**. They should return a named list containing two elements, **matData** and **matRowLabel**.

The current implementation of **TableToLongForm** has no Pre Row algorithms, but has support for external modules that add Pre Row algorithms.

15b $\langle \text{Pare Pre Row 15b} \rangle \equiv$
 `## Empty`

4.2 Parentage - Pre Col

Parentage Pre Col algorithms should take two arguments, **matData** and **matColLabel**. They should return a named list containing two elements, **matData** and **matColLabel**.

15c $\langle \text{Pare Pre Col 15c} \rangle \equiv$
 $\langle \text{Mismatched Col Labels 16a} \rangle$
 $\langle \text{Misaligned Col Parent 16b} \rangle$
 $\langle \text{Multirow Col Labels 18} \rangle$

Column Label	
	1
	2
	3

Column Label	
	1
	2
	3

Table 1: An example of mismatched column labels. The label is in a different column to the data it belongs to. The algorithm can detect this as mismatched as they have the same number of non-empty columns (1), and have empty columns in each subset (seen easily in the left table as the 2 empty cells). Such cases can occur due to some misguided attempts to visually align the label to the data (e.g. table on the right).

4.2.1 Case Mismatched Column Labels

We check for any mismatched column labels by checking if there are the same number of non-empty columns for the two subsets, and that there are empty columns in the subsets, which together imply mismatched column labels. If that is the case, we update our mat Subsets as required.

```

16a  <Mismatched Col Labels 16a>≡
      ParePreColMismatch =
      function(matData, matColLabel){
        colsData = IdentNonEmpty(matData, 2)
        colsLabels = IdentNonEmpty(matColLabel, 2)
        if(length(colsData) == length(colsLabels)){
          if(ncol(matData) != length(colsData)){
            matColLabel = matColLabel[,colsLabels,drop=FALSE]
            matData = matData[,colsData,drop=FALSE]
          }
          list(matData = matData, matColLabel = matColLabel)
        }
      }
      TTLFaliasAdd("ParePreCol", "ParePreColMismatch", "mismatch",
                  "Base Algorithm", paste("Correct for column labels",
                  "not matched correctly over data (label in a",
                  "different column to data)"))

```

Uses IdentNonEmpty 13a and TTLFaliasAdd 8.

4.2.2 Case Misaligned Column Parents

We correct for any misaligned column parents by using pattern matching to detect parent-groupings, and then realigning the parents.

```

16b  <Misaligned Col Parent 16b>≡
      ParePreColMisaligned =
      function(matData, matColLabel){
        TCRsink("MCPBefore", matColLabel)
        for(i in 1:nrow(matColLabel)){
          currow = matColLabel[i,]
          <Search for Pattern 17a>
          <Align Column Parents 17b>
        }
        TCRsink("MCPAfter", matColLabel)
        list(matData = matData, matColLabel = matColLabel)
      }
      TTLFaliasAdd("ParePreCol", "ParePreColMisaligned", "misalign",
                  "Base Algorithm", paste("Correct for column labels",
                  "not aligned correctly over data (parents not",
                  "positioned on the far-left, relative to their",
                  "children in the row below)"))

```

Uses TCRsink 7 and TTLFaliasAdd 8.

Example values for **ToyExComplete.csv** (ID: MCPBefore)

```
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      "Col Parent1" NA      NA      NA      "Col Parent2"
[3,] "Col"    "Col"    "Col"    "Col"    "Col"    "Col"
[4,] "Child1" "Child2"  "Child3" "Child4" "Child1" "Child2"
```

Example values for **ToyExComplete.csv** (ID: MCPAfter)

```
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2" NA
[3,] "Col"      "Col"    "Col"    "Col"    "Col"    "Col"
[4,] "Child1"    "Child2" "Child3" "Child4" "Child1"    "Child2"
```

	Column Parent1			Column Parent2	
Child1	Child2	Child3	Child1	Child2	Child3

Table 2: An example of misaligned column parents. For our low-level Parentage algorithm to work, we want the Column Parents to be in the left-most cell of their parent-grouping.

The value of `curPattern` will be the following:

- If completely empty (all NA), return NA.
- If any empty, check pattern of emptiness. In the above Table row 1, this will find the pattern: NonEmpty-Empty-NonEmpty which occurs twice. Hence return 2.
- Else, all cells are non-empty, check pattern of contents. In the above Table row 2, this will find the pattern: Child1-Child2-Child3 which occurs twice. Hence return 2.

17a $\langle \text{Search for Pattern 17a} \rangle \equiv$

```
curPattern =
  if(all(is.na(currow))) NA
  else if(any(is.na(currow))) IdentPattern(is.na(currow))
  else IdentPattern(currow)
```

Uses `IdentPattern 13b`.

For each subset of the row (based on pattern), move any empty cells (NA) to the end, hence aligning the non-empty cell (the parent) to the left.

17b $\langle \text{Align Column Parents 17b} \rangle \equiv$

```
if(!is.na(curPattern)){
  nParents = length(currow)/curPattern
  for(j in 1:nParents){
    curcols = 1:curPattern + curPattern * (j - 1)
    cursub = currow[curcols]
    currow[curcols] = c(cursub[!is.na(cursub)], cursub[is.na(cursub)])
    TCRsink("ACP", cursub, currow[curcols])
  }
  matColLabel[i,] = currow
}
```

Uses `TCRsink 7`.

Example values for **ToyExComplete.csv** (ID: ACP)

```
> cursub
      V4      V5      V6      V7
      NA "Col Parent1"      NA      NA

> currow[curcols]
      V4      V5      V6      V7
"Col Parent1"      NA      NA      NA
```

4.2.3 Case Multi-row Column Labels

It is also quite common for Col Labels that are too wide to be physically split over multiple rows to manage the width of the labels. For now, we simply assume that any rows that are not full (and hence not parents) should all really be a single row of children, and collapse these.

```
18 <Multirow Col Labels 18>≡
  ParePreColMultirow =
  function(matData, matColLabel){
    fullrows = apply(matColLabel, 1, function(x) all(!is.na(x)))
    if(any(diff(fullrows) > 1))
      warning("full rows followed by not full rows!")
    if(any(fullrows)){
      pastestring = ""
      pasterows = which(fullrows)
      for(i in 1:length(pasterows))
        pastestring[i] = paste0("matColLabel[", pasterows[i],
                                ",,drop=FALSE]")
      collapsedlabels =
        eval(parse(text = paste0("paste(",
                                  paste(pastestring, collapse = ", ", "),"")))

      TCRsink("MCLBefore", matColLabel)
      matColLabel = rbind(matColLabel[!fullrows,,drop=FALSE],
                          collapsedlabels, deparse.level = 0)
      TCRsink("MCLAfter", matColLabel)
    }
    list(matData = matData, matColLabel = matColLabel)
  }
  TTLFaliasAdd("ParePreCol", "ParePreColMultirow", "multirow",
              "Base Algorithm", paste("Merge long column labels",
              "that were physically split over multiple rows",
              "back into a single label"))
```

Uses TCRsink 7 and TTLFaliasAdd 8.

Example values for **ToyExComplete.csv** (ID: MCLBefore)

```
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2" NA
[3,] "Col"      "Col"      "Col"      "Col"      "Col"      "Col"
[4,] "Child1"      "Child2" "Child3" "Child4" "Child1"      "Child2"
```

Example values for **ToyExComplete.csv** (ID: MCLAfter)

```
> matColLabel
      V4      V5      V6      V7      V8
[1,] NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2"
[3,] "Col Child1" "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V9
[1,] NA
[2,] NA
[3,] "Col Child2"
```

4.3 Parentage - Front

This front end function takes the **matLabel**, which can be the **matRowLabel** or the transpose of the **matColLabel**, and constructs an initialising **plist**, which is used to make the first call to the Main function.

19a $\langle \text{Pare Front 19a} \rangle \equiv$

```
PareFront =
  function(matLabel)
    PareMain(matSub = matLabel, plist =
      list(rows = 1:nrow(matLabel), cols = 1:ncol(matLabel)))
```

Defines:

PareFront, used in chunks 26b and 27.

Uses **PareMain** 19b.

4.4 Parentage - Main

The purpose of the **PareMain** function is to identify (or *Discern*, to better differentiate this stage from the *Identification* stage) hierarchical relationships (the *Parentage*) in the data.

It first makes various checks for fringe cases, then calls various detection algorithms (**Pare Low Levels**) to discern the parentage.

19b $\langle \text{Pare Main 19b} \rangle \equiv$

```
PareMain =
  function(matSub, plist){
     $\langle \text{If only one column 20a} \rangle$ 
     $\langle \text{If first column empty 20b} \rangle$ 
     $\langle \text{If only one row 20c} \rangle$ 
     $\langle \text{If first cell empty 21a} \rangle$ 
     $\langle \text{Otherwise call Pare Low Levels 21b} \rangle$ 
    class(res) = "plist"
    res
  }
```

Defines:

PareMain, used in chunks 19–21.

If only one column is found then this means we are in the right-most column (or there was only one column to begin with), and hence the currently examined cells cannot be parents. We return the rows of these children as a vector, with names that correspond to their labels.

20a *<If only one column 20a>*≡

```

    if(length(plist$cols) == 1){
      res = structure(plist$rows, .Names = matSub[plist$rows, plist$cols])
      res = attrLoc(res, cols = plist$col)
      TCRsink("IOOC", plist, res)
    }

```

Uses attrLoc 6b and TCRsink 7.

Example values for **ToyExComplete.csv** (ID: IOOC)

```

> plist
$rows
[1] 3 4

$cols
[1] 2

> res
Row Child-Child1 Row Child-Child2
          3              4

```

If the first column is found to be empty, then we will shift to the next column (which we know exists because we passed the check for only one column).

20b *<If first column empty 20b>*≡

```

    else if(all(is.na(matSub[plist$rows, plist$cols[1]]))){
      plist$cols = plist$cols[-1]
      res = PareMain(matSub, plist)
    }

```

Uses PareMain 19b.

If only one row is found then our row is a parent to itself (we know there are children in the row as we passed the check for only one column). We return the row as a numeric vector, nested in a list using correct parentage and names of the parentage within the row.

20c *<If only one row 20c>*≡

```

    else if(length(plist$rows) == 1){
      res = structure(plist$rows,
        .Names = matSub[plist$rows, plist$cols[length(plist$cols)]]
      res = attrLoc(res, cols = plist$cols[length(plist$cols)])
      for(i in (length(plist$cols) - 1):1){
        res = list(res)
        names(res) = matSub[plist$rows, plist$cols[i]]
        res = attrLoc(res, rows = plist$rows, cols = plist$cols[i])
      }
      TCRsink("IOOR", plist, res)
    }

```

Uses attrLoc 6b and TCRsink 7.

Example values for **ToyExComplete.csv** (ID: 100R)

```
> res
Never occurs
```

If the first cell is empty, after all previous checks, then this is an unrecognised format and we return a warning message.

```
21a <If first cell empty 21a>≡
      else if(is.na(matSub[plist$rows[1], plist$cols[1]])){
        warning("cell[1, 1] is empty")
        print(plist)
        res = NA
      }
```

If we have passed all the checks, we can then call the Low Level **Pare** functions. We first call **ByEmptyRight** to check for *empty right* situations. If none are found, it returns NA, in which case we try **ByEmptyBelow** instead.

We then loop through each element of the returned list and call the main function, as per the recursive nature of the function.

```
21b <Otherwise call Pare Low Levels 21b>≡
      else{
        res = PareByEmptyRight(matSub, plist)
        if(any(is.na(res)))
          res = PareByEmptyBelow(matSub, plist)
        for(i in 1:length(res))
          res[[i]] = PareMain(matSub, res[[i]])
        res
      }
```

Uses **PareByEmptyBelow** 24, **PareByEmptyRight** 21d, and **PareMain** 19b.

4.5 Parentage - Low Level Functions

The Low Level Parentage functions are called by the Main Parentage function. In particular, **ByEmptyRight** is always called first. Then **ByEmptyBelow** is called on the results of the above.

```
21c <Pare Low Level 21c>≡
      <Pare By Empty Right 21d>
      <Pare By Empty Below 24>
```

4.5.1 Pare By Empty Right

We check to see if we have an *empty right* situation. If we do not, we return NA.

```
21d <Pare By Empty Right 21d>≡
      PareByEmptyRight =
        function(matSub, plist)
          with(plist,
            if(all(is.na(matSub[rows[1], cols[-1]]))){
              <Check for Other Empty Rights 21e>
              <Case Single Empty Right 22>
              <Case Multiple Empty Rights 23>
              res
            } else NA)
```

Defines:

PareByEmptyRight, used in chunk 21b.

```
21e <Check for Other Empty Rights 21e>≡
      emptyrights = apply(matSub[rows, cols[-1],drop=FALSE], 1,
        function(x) all(is.na(x)))
      rowemptyright = rows[emptyrights]
```

1	<i>New Zealand</i>	
2	Auckland	
3	Accounting	Male
4		Female
5	Economics	Male
6		Female
7	Statistics	Male
8		Female
9	Wellington	
10	Economics	Male
11		Female
12	Statistics	Male
13		Female
14	<i>Australia</i>	
15	Sydney	
16	Accounting	Male
17		Female
18	Economics	Male
19		Female

Consider the toy example on the left.

In this case we do not have a simple `ByEmptyRight` structure. We have *super-parents* in the form of countries (New Zealand and Australia), and also *parents* in the form of cities (Auckland, Wellington and Sydney). To handle situations such as this, we must **Check for Other Empty Rights**.

If only a **Single Empty Right** is found, the situation is simple and we simply pass on the children of the single parent for the next iteration of `PareMain`.

However, if **Multiple Empty Rights** are found, we must identify the super-parents, and pass on the *children* of these super-parents (which would, in turn, contain parents and their children) as a list, to be handled in the next iteration of `PareMain`. In this example, we would have a list of length 2. The first element of the list would contain the `plist` with `rows` 2 to 13 (corresponding to the children of the New Zealand super-parent). The second element would have `rows` 15 to 19.

In the case of only a single empty right, we know there is only a single parent, which is the first line. Thus we take everything except the first line (which will be the rows of the children of this parent) and pass this through with correct naming.

```
22 <Case Single Empty Right 22>≡
    if(length(rowemptyright) == 1){
        res = list(list(rows = rows[-1], cols = cols))
        names(res) = matSub[rows[1], cols[1]]
        res = attrLoc(res, rows = rows[1], cols = cols[1])
        TCRsink("CSER", res)
    }
```

Uses `attrLoc` 6b and `TCRsink` 7.

Example values for **ToyExComplete.csv** (ID: CSER)

```
> res
Never occurs
```

In the case of multiple empty rights, we first call `diff` to compute the gap in rows between the empty rights. If the value of `rowdiff[i]` is 1, this means there is no gap between the i^{th} `rowemptyright` and the $(i + 1)$ `rowemptyright`. This happens with *super-parents* as described in the example above. In this case, we gather these super-parents and ignore all other `rowemptyright` (the parents inside the super-parents will be handled at the next iteration of `PareMain`). Note, we assume there are never any super-super-parents (i.e. we can only handle a maximum of 2-levels of parentage in the same column).

Whether or not super-parents were identified, we compute the rows for the children of each parent (or super-parent) identified by `rowemptyright` and pass this through as a list, with correct naming.

```
23  <Case Multiple Empty Rights 23>≡
    else{
      rowdiff = diff(rowemptyright)
      if(any(rowdiff == 1))
        rowemptyright = rowemptyright[c(rowdiff == 1, FALSE)]

      rowstart = pmin(rowemptyright + 1, max(rows))
      rowend = c(pmax(rowemptyright[-1] - 1, min(rows)), max(rows))

      res = list()
      for(i in 1:length(rowstart))
        res[i] = list(list(rows = rowstart[i]:rowend[i], cols = cols))
      names(res) = matSub[rowemptyright, cols[1]]
      res = attrLoc(res, rows = rowemptyright, cols = cols[1])
      TCRsink("CMER", res)
    }
```

Uses `attrLoc` 6b and `TCRsink` 7.

Example values for **ToyExComplete.csv** (ID: CMER)

```
> res
$'Row Super-Parent'
$'Row Super-Parent'$rows
[1] 2 3 4 5 6 7 8 9 10

$'Row Super-Parent'$cols
[1] 1 2
```

4.5.2 Pare By Empty Below

We check which cells are empty below (there should be at least 1 based on previous checks). Based on this, we compute the rows for the children of each parent and pass this through as a list, with correct naming.

```
24  ⟨Pare By Empty Below 24⟩≡
    PareByEmptyBelow =
      function(matSub, plist)
        with(plist, {
          emptybelow = is.na(matSub[rows, cols[1]])
          rowstart = rows[!emptybelow]
          rowend = c(rowstart[-1] - 1, max(rows))
          res = list()
          for(i in 1:length(rowstart))
            res[i] = list(list(rows = rowstart[i]:rowend[i], cols = cols[-1]))
          names(res) = matSub[rowstart, cols[1]]
          res = attrLoc(res, rows = rowstart, cols = cols[1])
          TCRsink("PBEB", res)
          res
        })
```

Defines:

PareByEmptyBelow, used in chunk 21b.

Uses attrLoc 6b and TCRsink 7.

Example values for **ToyExComplete.csv** (ID: PBEB)

```
> res
$'Row Child1'
$'Row Child1'$rows
[1] 3 4

$'Row Child1'$cols
[1] 2

$'Row Child2'
$'Row Child2'$rows
[1] 5 6

$'Row Child2'$cols
[1] 2
```

5 Reconstruction

We separate the Reconstruction functions into two groups.

Recons Main contains the main function that is called by the *Front End* function.

Recons Low Level contains supporting functions called by the *Recons Main* function.

25a $\langle \text{Reconstruction 25a} \rangle \equiv$
 $\langle \text{Recons Main 25b} \rangle$
 $\langle \text{Recons Low Level 28a} \rangle$

5.1 Reconstruction - Main Function

The **ReconsMain** function is, in a manner of speaking, the true **TableToLongForm** function, as it makes the calls to **IdentMain** and **PareFront**, in conjunction with its own **Recons Low Level** functions, to carry out the conversion.

25b $\langle \text{Recons Main 25b} \rangle \equiv$
ReconsMain =
 function(matFull, IdentResult,
 IdentPrimary, IdentAuxiliary,
 ParePreRow, ParePreCol){
 $\langle \text{Call Ident Algos 26a} \rangle$
 $\langle \text{Reconstruct Row Labels 26b} \rangle$
 $\langle \text{Reconstruct Col Labels 27} \rangle$
 }

Defines:

ReconsMain, used in chunk 4a.

Uses **IdentResult** 26a.

IdentPrimary -Choose 1- Takes matFull, returns an IdentResult.

IdentAuxiliary -Choose any combination (in any order)- Takes matFull and IdentResult, returns adjusted IdentResult.

26a *<Call Ident Algos 26a>*≡

```

  if(is.null(IdentResult)){
    IdentPrimary = TTLFaliasGet("IdentPrimary", IdentPrimary)
    IdentResult = do.call(IdentPrimary, list(matFull = matFull))
    if(!is.null(IdentAuxiliary))
      for(AuxAlgo in IdentAuxiliary){
        AuxAlgo = TTLFaliasGet("IdentAuxiliary", AuxAlgo)
        IdentResult = do.call(AuxAlgo,
          list(matFull = matFull, IdentResult = IdentResult))
      }
  }

```

Defines:

IdentResult, used in chunks 4a, 12, and 25–27.

Uses TTLFaliasGet 8.

ParePreRow -Choose any combination (in any order)- Takes matData and matRowLabel, and adjusts them as required. Current implementation has none.

ParePreCol -Choose any combination (in any order)- Takes matData and matColLabel, and adjusts them as required.

ParePrimary -No Choice- Constructs the plist. Handles Empty Right and Empty Below and their reduced subsets (e.g. lowest level child with no remaining parentage).

We create a subset of **matFull** that contains just the Row Labels. We also remove any columns that are completely empty (N.B. this may no longer be necessary, need to do some testing).

We call **PareFront** on our subset to discern the parentage of the Row Labels. We then use this to reconstruct the portion of the LongForm Dataframe relating to the Row Labels and assign this to **rowvecs**.

26b *<Reconstruct Row Labels 26b>*≡

```

  matData = with(IdentResult,
    matFull[rows$data, cols$data, drop=FALSE])
  matRowLabel = with(IdentResult,
    matFull[rows$data, cols$label, drop=FALSE])
  if(!is.null(ParePreRow))
    for(PreAlgo in ParePreRow){
      PreAlgo = TTLFaliasGet("ParePreRow", PreAlgo)
      PreOut = do.call(PreAlgo,
        list(matData = matData, matRowLabel = matRowLabel))
      matData = PreOut$matData
      matRowLabel = PreOut$matRowLabel
    }
  rowplist = PareFront(matRowLabel)
  rowvecs = ReconsRowLabels(rowplist)
  TCRsink("RRL", rowplist, rowvecs)

```

Defines:

rowplist, used in chunk 27.

rowvecs, used in chunks 27–30.

Uses IdentResult 26a, PareFront 19a, ReconsRowLabels 28b, TCRsink 7, and TTLFaliasGet 8.

Example values for **ToyExComplete.csv** (ID: RRL)

```
> rowplist
$'Row Super-Parent'
+ Row Parent1 (2, 1)
- + Row Child1 (3, 1)
- - + Row Child-Child1 (3, 2)
- - + Row Child-Child2 (4, 2)
- + Row Child2 (5, 1)
- - + Row Child-Child1 (5, 2)
- - + Row Child-Child2 (6, 2)
+ Row Parent2 (7, 1)
- + Row Child1 (8, 1)
- - + Row Child-Child1 (8, 2)
- - + Row Child-Child2 (9, 2)
- + Row Child2 (10, 1)
- - + Row Child-Child2 (10, 2)

> rowvecs
[,1]      [,2]      [,3]      [,4]
"Row Super-Parent" "Row Parent1" "Row Child1" "Row Child-Child1"
"Row Super-Parent" "Row Parent1" "Row Child1" "Row Child-Child2"
"Row Super-Parent" "Row Parent1" "Row Child2" "Row Child-Child1"
"Row Super-Parent" "Row Parent1" "Row Child2" "Row Child-Child2"
"Row Super-Parent" "Row Parent2" "Row Child1" "Row Child-Child1"
"Row Super-Parent" "Row Parent2" "Row Child1" "Row Child-Child2"
```

Due to the various fringe cases that exist with Col Labels, we cannot simply call **PareFront** and must instead call **PareCol**. We then create a subset of **matFull** that contains just the Col Labels and call **ReconsColLabels** which in truth reconstruct the entire LongForm Dataframe by making use of the **rowvecs** generated above.

We grab subsets of **matFull** that correspond to the Column Labels region and the Data region. After handling for all the different cases, we can simply transpose our Col Labels and call **PareFront** on it.

```
27 <Reconstruct Col Labels 27>≡
  matColLabel = with(IdentResult,
    matFull[rows$label, cols$data, drop=FALSE])
  if(!is.null(ParePreCol))
    for(PreAlgo in ParePreCol){
      PreAlgo = TTLFaliasGet("ParePreCol", PreAlgo)
      PreOut = do.call(PreAlgo,
        list(matData = matData, matColLabel = matColLabel))
      matData = PreOut$matData
      matColLabel = PreOut$matColLabel
    }
  colplist = PareFront(t(matColLabel))
  matDataReduced = matData[unlist(rowplist),, drop=FALSE]
  res = ReconsColLabels(colplist, matDataReduced, rowvecs)
  TCRsink("RCL", colplist, res)
  list(datafr = res, oriTable = matFull, IdentResult = IdentResult,
    rowplist = rowplist, colplist = colplist)
```

Uses **IdentResult** 26a, **PareFront** 19a, **ReconsColLabels** 29a, **rowplist** 26b, **rowvecs** 26b, **TCRsink** 7, and **TTLFaliasGet** 8.

Example values for **ToyExComplete.csv** (ID: RCL)

```
> colplist
$'Col Parent1'
+ Col Child1 (1, 3)
+ Col Child2 (2, 3)
+ Col Child3 (3, 3)
+ Col Child4 (4, 3)

$'Col Parent2'
+ Col Child1 (5, 3)
+ Col Child2 (6, 3)
+ Col Child3 (7, 3)
+ Col Child4 (8, 3)

> res
      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN
1 Col Parent1 Row Super-Parent Row Parent1 Row Child1 Row Child-Child1
2 Col Parent1 Row Super-Parent Row Parent1 Row Child1 Row Child-Child2
3 Col Parent1 Row Super-Parent Row Parent1 Row Child2 Row Child-Child1
4 Col Parent1 Row Super-Parent Row Parent1 Row Child2 Row Child-Child2
5 Col Parent1 Row Super-Parent Row Parent2 Row Child1 Row Child-Child1
6 Col Parent1 Row Super-Parent Row Parent2 Row Child1 Row Child-Child2
  Col Child1 Col Child2 Col Child3 Col Child4
1          12          22          32          42
2          13          23          33          43
3          14          24          34          44
4          15          25          35          45
5          17          27          37          47
6          18          28          38          48
```

5.2 Reconstruction - Low Level Functions

The Low Level Reconstruction functions are called by the Main Reconstruction function. In particular, `ReconsRowLabels` is always called first and its results are one of the arguments for `ReconsColLabels`, which finishes the reconstruction of the entire LongForm Dataframe.

28a $\langle \text{Recons Low Level 28a} \rangle \equiv$
 $\langle \text{Recons Row Labels 28b} \rangle$
 $\langle \text{Recons Column Labels 29a} \rangle$

5.2.1 Reconstruction - Row Labels

`ReconsRowLabels` iterates down the row parentage list (`plist`) recursively, extracting the names and using this to construct the columns of the finished LongForm Dataframe corresponding to the row labels. The final output is what was shown in the *Reconstruct Row Labels* chunk above as `rowvecs[1:4,]`.

28b $\langle \text{Recons Row Labels 28b} \rangle \equiv$

```
ReconsRowLabels =
function(plist)
if(is.list(plist)){
  rowvecs = as.list(names(plist))
  for(i in 1:length(rowvecs))
    rowvecs[[i]] = cbind(rowvecs[[i]], ReconsRowLabels(plist[[i]]))
  do.call(rbind, rowvecs)
} else as.matrix(names(plist))
```

Defines:

`ReconsRowLabels`, used in chunk 26b.

Uses `rowvecs` 26b.

Example values for **ToyExComplete.csv** (ID: RRL)

```
> rowvecs[1:4,]  
Never occurs
```

5.2.2 Reconstruction - Column Labels

As with the row labels, `ReconsColLabels` iterates down the column parentage list (`plist`) recursively. We also need to handle the parents differently from the lowest level child. The final output is what was shown in the *Reconstruct Col Labels* chunk above as `res[1:4,]`.

```
29a <Recons Column Labels 29a>≡  
  ReconsColLabels =  
    function(plist, matData, rowvecs){  
      <Recons Col Parents 29b>  
      <Recons Col Children 30>  
      datfr  
    }
```

Defines:

`ReconsColLabels`, used in chunks 27 and 29b.

Uses `rowvecs` 26b.

Example values for **ToyExComplete.csv** (ID: RCL)

```
> res[1:4,]  
Never occurs
```

Any parents are used to construct additional columns of factors (the labels of the parents) for the LongForm Dataframe, which is attached to the portion previously constructed in `ReconsRowLabels`.

```
29b <Recons Col Parents 29b>≡  
  if(is.list(plist)){  
    colvecs = as.list(names(plist))  
    for(i in 1:length(colvecs)){  
      colvecs[[i]] = cbind(colvecs[[i]],  
                           ReconsColLabels(plist[[i]], matData, rowvecs))  
      colnames(colvecs[[i]])[1] = "UNKNOWN"  
    }  
    datfr = do.call(rbindddf, colvecs)  
  }
```

Uses `rbindddf` 5c, `ReconsColLabels` 29a, and `rowvecs` 26b.

For the lowest level child, we extract the relevant ‘data bits’ from the original table and bind it to our Dataframe, using the lowest level child as the labels of these columns of data values.

```
30 <Recons Col Children 30>≡
    else{
      datbit = matData[,plist,drop=FALSE]
      TCRsink("RCC", plist, matData, datbit)
      datlist = NULL
      for(j in 1:ncol(datbit)){
        asnumber = suppressWarnings(as.numeric(datbit[,j]))
        if(all(is.na(datbit[,j])) || !all(is.na(asnumber)))
          datlist[[j]] = asnumber
        else
          datlist[[j]] = datbit[,j]
      }
      datbit = do.call(cbind, datlist)
      ## Specify row.names to avoid annoying warnings
      datfr =
        cbind(as.data.frame(rowvecs, row.names = 1:nrow(rowvecs)), datbit)
      colnames(datfr) =
        c(rep("UNKNOWN", length = ncol(rowvecs)), names(plist))
    }
```

Uses [rowvecs 26b](#) and [TCRsink 7](#).

6 Chunk Index

⟨Align Column Parents 17b⟩
⟨Back End 5b⟩
⟨BEattrLoc 6b⟩
⟨BEprintplist 6a⟩
⟨BERbinddf 5c⟩
⟨BETCRsink 7⟩
⟨BETTTLFalias 8⟩
⟨Call Ident Algos 26a⟩
⟨Call Ident MostCommonBoundary 10a⟩
⟨Case Multiple Empty Rights 23⟩
⟨Case Single Empty Right 22⟩
⟨Check for Other Empty Rights 21e⟩
⟨Check if pattern repeats 14a⟩
⟨Check if sequence 12c⟩
⟨Check Table arg 4b⟩
⟨Cleanup MostCommonBoundary Results 11a⟩
⟨Construct rowlist and collist 10b⟩
⟨Discern Parentage 15a⟩
⟨document header 3b⟩
⟨Front End 4a⟩
⟨Get Non empty rows and cols 9d⟩
⟨Ident Auxiliary 11b⟩
⟨Ident by Most Common Boundary 9c⟩
⟨Ident by Sequence 12a⟩
⟨Ident Most Common Boundary 14b⟩
⟨Ident Non Empty 13a⟩
⟨Ident Pattern 13b⟩
⟨Ident Primary 9b⟩
⟨Ident Support 12d⟩
⟨Identification 9a⟩
⟨If empty take next column 12b⟩
⟨If first cell empty 21a⟩
⟨If first column empty 20b⟩
⟨If only one column 20a⟩
⟨If only one row 20c⟩
⟨Look for potential repeat 13c⟩
⟨Misaligned Col Parent 16b⟩
⟨Mismatched Col Labels 16a⟩
⟨Multirow Col Labels 18⟩
⟨Otherwise call Pare Low Levels 21b⟩
⟨Pare By Empty Below 24⟩
⟨Pare By Empty Right 21d⟩
⟨Pare Front 19a⟩
⟨Pare Low Level 21c⟩
⟨Pare Main 19b⟩
⟨Pare Pre Col 15c⟩
⟨Pare Pre Row 15b⟩
⟨Recons Col Children 30⟩
⟨Recons Col Parents 29b⟩
⟨Recons Column Labels 29a⟩
⟨Recons Low Level 28a⟩
⟨Recons Main 25b⟩
⟨Recons Row Labels 28b⟩
⟨Reconstruct Col Labels 27⟩
⟨Reconstruct Row Labels 26b⟩

<Reconstruction 25a>
 <Search for Pattern 17a>
 <Setup diagnostics file 5a>
 <TableToLongForm.R 3a>

7 Identifier Index

Numbers indicate the chunks in which the function appears. Underline indicates the chunk where the function is defined.

attrLoc: [6b](#), 20a, 20c, 22, 23, 24
 IdentMostCommonBoundary: 10a, [14b](#)
 IdentNonEmpty: 9d, 11a, [13a](#), 16a
 IdentPattern: [13b](#), 17a
 IdentResult: 4a, 12a, 12c, 25b, [26a](#), 26b, 27
 PareByEmptyBelow: 21b, [24](#)
 PareByEmptyRight: 21b, [21d](#)
 PareFront: [19a](#), 26b, 27
 PareMain: 19a, [19b](#), 20b, 21b
 rbinddf: [5c](#), 29b
 ReconsCollLabels: 27, [29a](#), 29b
 ReconsMain: 4a, [25b](#)
 ReconsRowLabels: 26b, [28b](#)
 rowplist: [26b](#), 27
 rowvecs: [26b](#), 27, 28b, 29a, 29b, 30
 TCRsink: [7](#), 10a, 10b, 16b, 17b, 18, 20a, 20c, 22, 23, 24, 26b, 27, 30
 TTLFaliasAdd: [8](#), 9c, 12a, 16a, 16b, 18
 TTLFaliasGet: [8](#), 26a, 26b, 27
 TTLFBaseEnv: 5a, [7](#), 8

References

- R Core Team, 2013. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria.
 URL <http://www.R-project.org/>
- Ramsey, N., Sept 1994. Literate programming simplified. IEEE Software 11 (5), 97–105.
 URL <http://www.cs.tufts.edu/~nr/noweb/>

8 Appendix: TCRO

The following appendix is automatically generated and consists of the diagnostics output of various Tables.

8.1 DIATop100BabyBoysNames2011.xls

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Table 2												
2	Top 100 Baby Boys' Names in New Zealand												
3	December 2004–2011 Years												
4													
5	Rank		2,004			2,005			2,006			2,007	
6			Name		No.	Name		No.	Name		No.	Name	
7													
8		1	Joshua		504	Jack		488	Jack		534	Jack	
9		2	Jack		491	Joshua		386	Joshua		406	James	
10		3	Benjamin		370	Samuel		340	Daniel		370	Joshua	
11		4	Samuel		357	Daniel		321	James		356	Daniel	
12		5	Ethan		351	James		318	William		332	William	
13		6	Matthew		329	Benjamin		297	Samuel		320	Oliver	
14		7	James		327	Liam		284	Jacob		306	Samuel	
15		8	Jacob		326	William		284	Thomas		293	Benjamin	
16		9	Daniel		325	Ethan		278	Benjamin		282	Ethan	
17		10	Liam		315	Jacob		276	Ryan		282	Ryan	
18		11	Ryan		312	Ryan		276	Liam		275	Jacob	
19		12	William		304	Thomas		262	Oliver		270	Liam	
20		13	Thomas		287	Matthew		253	Ethan		258	Thomas	
21		14	Caleb		263	Oliver		249	Luke		249	Lucas	
22		15	Oliver		250	Caleb		219	Matthew		246	Luke	
23		16	Dylan		248	Luke		206	Noah		234	Noah	
24		17	Jayden		219	Noah		197	Caleb		217	Riley	
25		18	Connor		214	Connor		188	Max		217	Jayden	
26		19	Luke		197	Max		179	Jayden		206	Matthew	
27		20	Logan		190	Alexander		176	Logan		205	Alexander	
28		21	Cameron		183	Cameron		174	Dylan		203	Hunter	
29		22	Alexander		172	Dylan		171	Connor		188	Dylan	
30		23	Riley		170	Logan		168	Alexander		184	Blake	
31		24	Max		168	Jayden		159	Blake		180	Max	
32		25	Michael		153	Nathan		158	Riley		169	Caleb	
33		26	Joseph		151	Jordan		154	Charlie		164	Lachlan	
34		27	Alex		147	Joseph		146	Nathan		164	Logan	
35		28	Isaac		144	George		144	Tyler		160	Connor	
36		29	Nathan		141	Riley		144	George		154	Tyler	
37		30	Blake		137	Blake		139	Joseph		154	Joseph	
38		31	George		137	Michael		138	Lucas		149	Cameron	
39		32	Jordan		137	Harrison		133	Lachlan		148	George	
40		33	Lachlan		134	Tyler		128	Harrison		147	Charlie	
41		34	Tyler		134	Alex		125	Cameron		143	Nathan	
42		35	Levi		128	Isaac		118	Jordan		142	Alex	
43		36	Noah		128	Hunter		113	Isaac		134	Finn	

```

> rowData
[1] 8 107
> colData
[1] 2 26
> rowslist
$label
[1] 1 2 3 5 6

$data
[1] 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[19] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
[37] 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61
[55] 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
[73] 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
[91] 98 99 100 101 102 103 104 105 106 107

> colslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

> plist
$rows
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

```

```

[19] 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
[37] 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54
[55] 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72
[73] 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
[91] 91 92 93 94 95 96 97 98 99 100

```

```
$cols
```

```
[1] 1
```

```
> res
```

```
1 2 3 4 5 6
```

```
1 2 3 4 5 6
```

```
> rowplist
```

```
1 2 3 4 5 6
```

```
1 2 3 4 5 6
```

```
> rowvecs
```

```
[,1]
```

```
[1,] " 1"
```

```
[2,] " 2"
```

```
[3,] " 3"
```

```
[4,] " 4"
```

```
[5,] " 5"
```

```
[6,] " 6"
```

```
> matCollabel
```

```
V3 V5 V6 V8 V9 V11
```

```
[1,] NA NA NA NA NA NA
```

```
[2,] NA NA NA NA NA NA
```

```
[3,] NA NA NA NA NA NA
```

```
[4,] "2004" NA "2005" NA "2006" NA
```

```
[5,] "Name" "No." "Name" "No." "Name" "No."
```

```
> cursub
```

```
V3 V5
```

```
"2004" NA
```

```
> currow[curcols]
```

```
V3 V5
```

```
"2004" NA
```

```
> cursub
```

```
V6 V8
```

```
"2005" NA
```

```
> currow[curcols]
```

```
V6 V8
```

```
"2005" NA
```

```
> cursub
```

```
V9 V11
```

```
"2006" NA
```

```
> currow[curcols]
```

```
V9 V11
```

```
"2006" NA
```

```
> cursub
```

```
V12 V14
```

```
"2007" NA
```

```
> currow[curcols]
```

```
V12 V14
```

```
"2007" NA
```

```
> cursub
```

```
V15 V17
```

```
"2008" NA
```

```

> currow[curcols]
  V15    V17
"2008"    NA
> cursub
  V18    V20
"2009"    NA
> currow[curcols]
  V18    V20
"2009"    NA
> cursub
  V21    V23
"2010"    NA
> currow[curcols]
  V21    V23
"2010"    NA
> cursub
  V24    V26
"2011"    NA
> currow[curcols]
  V24    V26
"2011"    NA
> cursub
  V3     V5
"Name"  "No."
> currow[curcols]
  V3     V5
"Name"  "No."
> cursub
  V6     V8
"Name"  "No."
> currow[curcols]
  V6     V8
"Name"  "No."
> cursub
  V9     V11
"Name"  "No."
> currow[curcols]
  V9     V11
"Name"  "No."
> cursub
  V12    V14
"Name"  "No."
> currow[curcols]
  V12    V14
"Name"  "No."
> cursub
  V15    V17
"Name"  "No."
> currow[curcols]
  V15    V17
"Name"  "No."
> cursub
  V18    V20
"Name"  "No."
> currow[curcols]
  V18    V20
"Name"  "No."

```

```

> cursub
  V21    V23
"Name" "No."
> currow[curcols]
  V21    V23
"Name" "No."
> cursub
  V24    V26
"Name" "No."
> currow[curcols]
  V24    V26
"Name" "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> res
$'2004'
$'2004'$rows
[1] 1 2

$'2004'$cols
[1] 5

$'2005'
$'2005'$rows
[1] 3 4

$'2005'$cols
[1] 5

$'2006'
$'2006'$rows
[1] 5 6

$'2006'$cols
[1] 5

```

```
$'2007'  
$'2007'$rows  
[1] 7 8
```

```
$'2007'$cols  
[1] 5
```

```
$'2008'  
$'2008'$rows  
[1] 9 10
```

```
$'2008'$cols  
[1] 5
```

```
$'2009'  
$'2009'$rows  
[1] 11 12
```

```
$'2009'$cols  
[1] 5
```

```
> plist  
$rows  
[1] 1 2
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  1   2
```

```
> plist  
$rows  
[1] 3 4
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  3   4
```

```
> plist  
$rows  
[1] 5 6
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  5   6
```

```
> plist  
$rows
```

```
[1] 7 8
```

```
$cols
```

```
[1] 5
```

```
> res
```

```
Name No.
```

```
7 8
```

```
> plist
```

```
$rows
```

```
[1] 9 10
```

```
$cols
```

```
[1] 5
```

```
> res
```

```
Name No.
```

```
9 10
```

```
> plist
```

```
$rows
```

```
[1] 11 12
```

```
$cols
```

```
[1] 5
```

```
> res
```

```
Name No.
```

```
11 12
```

```
> plist
```

```
$rows
```

```
[1] 13 14
```

```
$cols
```

```
[1] 5
```

```
> res
```

```
Name No.
```

```
13 14
```

```
> plist
```

```
$rows
```

```
[1] 15 16
```

```
$cols
```

```
[1] 5
```

```
> res
```

```
Name No.
```

```
15 16
```

```
> plist
```

```
Name No.
```

```
1 2
```

```
> matData
```

	V4	V5	V7	V8	V10	V11
[1,]	"Joshua"	"504"	"Jack"	"488"	"Jack"	"534"
[2,]	"Jack"	"491"	"Joshua"	"386"	"Joshua"	"406"
[3,]	"Benjamin"	"370"	"Samuel"	"340"	"Daniel"	"370"
[4,]	"Samuel"	"357"	"Daniel"	"321"	"James"	"356"

```

[5,] "Ethan"      "351" "James"      "318" "William" "332"
[6,] "Matthew"    "329" "Benjamin"  "297" "Samuel"  "320"
> datbit
      V4      V5
[1,] "Joshua"  "504"
[2,] "Jack"    "491"
[3,] "Benjamin" "370"
[4,] "Samuel"  "357"
[5,] "Ethan"   "351"
[6,] "Matthew" "329"
> plist
Name No.
      3   4
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"  "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua" "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel" "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"  "356"
[5,] "Ethan"   "351" "James"  "318" "William" "332"
[6,] "Matthew" "329" "Benjamin" "297" "Samuel" "320"
> datbit
      V7      V8
[1,] "Jack"  "488"
[2,] "Joshua" "386"
[3,] "Samuel" "340"
[4,] "Daniel" "321"
[5,] "James"  "318"
[6,] "Benjamin" "297"
> plist
Name No.
      5   6
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"  "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua" "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel" "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"  "356"
[5,] "Ethan"   "351" "James"  "318" "William" "332"
[6,] "Matthew" "329" "Benjamin" "297" "Samuel" "320"
> datbit
      V10      V11
[1,] "Jack"  "534"
[2,] "Joshua" "406"
[3,] "Daniel" "370"
[4,] "James"  "356"
[5,] "William" "332"
[6,] "Samuel" "320"
> plist
Name No.
      7   8
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"  "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua" "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel" "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"  "356"

```

```

[5,] "Ethan"      "351" "James"      "318" "William" "332"
[6,] "Matthew"    "329" "Benjamin"  "297" "Samuel"  "320"
> datbit
      V13      V14
[1,] "Jack"    "499"
[2,] "James"    "369"
[3,] "Joshua"   "366"
[4,] "Daniel"   "351"
[5,] "William"  "324"
[6,] "Oliver"   "319"
> plist
Name No.
     9  10
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"    "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua"  "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel"  "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"   "356"
[5,] "Ethan"   "351" "James"  "318" "William" "332"
[6,] "Matthew" "329" "Benjamin" "297" "Samuel"  "320"
> datbit
      V16      V17
[1,] "Jack"    "449"
[2,] "James"    "378"
[3,] "William"  "352"
[4,] "Samuel"   "346"
[5,] "Joshua"   "332"
[6,] "Riley"    "328"
> plist
Name No.
     11  12
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"    "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua"  "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel"  "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"   "356"
[5,] "Ethan"   "351" "James"  "318" "William" "332"
[6,] "Matthew" "329" "Benjamin" "297" "Samuel"  "320"
> datbit
      V19      V20
[1,] "Jack"    "345"
[2,] "Oliver"  "342"
[3,] "James"   "337"
[4,] "Joshua"  "327"
[5,] "William" "326"
[6,] "Samuel"  "313"
> plist
Name No.
     13  14
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua"  "504" "Jack"  "488" "Jack"    "534"
[2,] "Jack"    "491" "Joshua" "386" "Joshua"  "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel"  "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"   "356"

```



```

[5,] "Ethan"      "351" "James"      "318" "William" "332"
[6,] "Matthew"    "329" "Benjamin"  "297" "Samuel"  "320"
> datbit
      V22      V23
[1,] "Liam"     "374"
[2,] "James"    "333"
[3,] "Oliver"   "327"
[4,] "Jack"     "325"
[5,] "William"  "320"
[6,] "Joshua"   "298"
> plist
Name No.
  15  16
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Joshua" "504" "Jack"  "488" "Jack"  "534"
[2,] "Jack"   "491" "Joshua" "386" "Joshua" "406"
[3,] "Benjamin" "370" "Samuel" "340" "Daniel" "370"
[4,] "Samuel"  "357" "Daniel" "321" "James"  "356"
[5,] "Ethan"   "351" "James"  "318" "William" "332"
[6,] "Matthew" "329" "Benjamin" "297" "Samuel" "320"
> datbit
      V25      V26
[1,] "Liam"     "315"
[2,] "Joshua"   "292"
[3,] "Oliver"   "286"
[4,] "Lucas"    "279"
[5,] "William"  "272"
[6,] "Noah"     "271"
> colplist
$'2004'
+ Name (1, 5)
+ No. (2, 5)

$'2005'
+ Name (3, 5)
+ No. (4, 5)

$'2006'
+ Name (5, 5)
+ No. (6, 5)

$'2007'
+ Name (7, 5)
+ No. (8, 5)

$'2008'
+ Name (9, 5)
+ No. (10, 5)

$'2009'
+ Name (11, 5)
+ No. (12, 5)

> res
      UNKNOWN UNKNOWN      Name No.
1      2004      1      Joshua 504

```

2	2004	2	Jack	491
3	2004	3	Benjamin	370
4	2004	4	Samuel	357
5	2004	5	Ethan	351
6	2004	6	Matthew	329

8.2 DIATop100BabyGirlsNames2011.xls

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Table 1												
2	Top 100 Baby Girls' Names in New Zealand												
3	December 2004–2011 Years												
4													
5	Rank		2,004			2,005			2,006			2,007	
6			Name		No.	Name		No.	Name		No.	Name	
7													
8		1	Emma		352	Emma		315	Charlotte		324	Ella	
9		2	Charlotte		330	Ella		292	Ella		320	Sophie	
10		3	Ella		306	Charlotte		278	Sophie		295	Olivia	
11		4	Sophie		299	Olivia		274	Emma		286	Emma	
12		5	Hannah		286	Jessica		257	Olivia		278	Charlotte	
13		6	Emily		282	Sophie		254	Emily		277	Emily	
14		7	Jessica		282	Grace		248	Grace		262	Lily	
15		8	Olivia		275	Hannah		223	Jessica		261	Grace	
16		9	Grace		261	Emily		216	Hannah		254	Hannah	
17		10	Isabella		206	Isabella		180	Lily		234	Isabella	
18		11	Georgia		201	Paige		180	Isabella		224	Jessica	
19		12	Samantha		196	Ruby		180	Lucy		194	Ruby	
20		13	Brooke		192	Lucy		174	Chloe		190	Amelia	
21		14	Lucy		190	Lily		169	Ruby		174	Lucy	
22		15	Paige		187	Maia		168	Georgia		168	Madison	
23		16	Lily		181	Brooke		162	Paige		167	Chloe	
24		17	Sarah		161	Georgia		162	Amelia		164	Brooke	
25		18	Holly		160	Holly		160	Maia		161	Ava	
26		19	Chloe		154	Chloe		150	Zoe		161	Mia	
27		20	Ruby		143	Amelia		146	Madison		157	Paige	
28		21	Madison		142	Samantha		141	Brooke		154	Zoe	
29		22	Amelia		140	Jade		137	Holly		150	Holly	
30		23	Zoe		132	Sarah		135	Samantha		150	Kate	
31		24	Mia		131	Kate		134	Sarah		149	Caitlin	
32		25	Caitlin		124	Caitlin		130	Mia		143	Maia	
33		26	Kate		123	Zoe		122	Ava		142	Georgia	
34		27	Jade		118	Madison		121	Jasmine		132	Samantha	
35		28	Maia		118	Amy		119	Kate		123	Sophia	
36		29	Amy		116	Mia		119	Hayley		122	Sienna	
37		30	Jasmine		114	Jasmine		118	Caitlin		121	Jade	
38		31	Amber		106	Hayley		114	Jade		114	Amber	
39		32	Hayley		102	Amber		99	Sophia		105	Maddison	
40		33	Molly		102	Anna		95	Amber		103	Sarah	
41		34	Sophia		101	Katie		92	Eva		102	Hayley	
42		35	Paris		100	Sophia		91	Molly		100	Amy	
43		36	Danielle		99	Molly		89	Amy		96	Summer	

```

> rowData
[1] 8 107
> colData
[1] 2 26
> rowslist
$label
[1] 1 2 3 5 6

$data
[1] 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[19] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
[37] 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61
[55] 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
[73] 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
[91] 98 99 100 101 102 103 104 105 106 107

> colslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

> plist
$rows
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

```

```

[19] 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
[37] 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54
[55] 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72
[73] 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
[91] 91 92 93 94 95 96 97 98 99 100

```

```
$cols
```

```
[1] 1
```

```
> res
```

```
1 2 3 4 5 6
```

```
1 2 3 4 5 6
```

```
> rowplist
```

```
1 2 3 4 5 6
```

```
1 2 3 4 5 6
```

```
> rowvecs
```

```
[,1]
```

```
[1,] " 1"
```

```
[2,] " 2"
```

```
[3,] " 3"
```

```
[4,] " 4"
```

```
[5,] " 5"
```

```
[6,] " 6"
```

```
> matCollabel
```

```
V3 V5 V6 V8 V9 V11
```

```
[1,] NA NA NA NA NA NA
```

```
[2,] NA NA NA NA NA NA
```

```
[3,] NA NA NA NA NA NA
```

```
[4,] "2004" NA "2005" NA "2006" NA
```

```
[5,] "Name" "No." "Name" "No." "Name" "No."
```

```
> cursub
```

```
V3 V5
```

```
"2004" NA
```

```
> currow[curcols]
```

```
V3 V5
```

```
"2004" NA
```

```
> cursub
```

```
V6 V8
```

```
"2005" NA
```

```
> currow[curcols]
```

```
V6 V8
```

```
"2005" NA
```

```
> cursub
```

```
V9 V11
```

```
"2006" NA
```

```
> currow[curcols]
```

```
V9 V11
```

```
"2006" NA
```

```
> cursub
```

```
V12 V14
```

```
"2007" NA
```

```
> currow[curcols]
```

```
V12 V14
```

```
"2007" NA
```

```
> cursub
```

```
V15 V17
```

```
"2008" NA
```

```

> currow[curcols]
  V15    V17
"2008"    NA
> cursub
  V18    V20
"2009"    NA
> currow[curcols]
  V18    V20
"2009"    NA
> cursub
  V21    V23
"2010"    NA
> currow[curcols]
  V21    V23
"2010"    NA
> cursub
  V24    V26
"2011"    NA
> currow[curcols]
  V24    V26
"2011"    NA
> cursub
  V3     V5
"Name"  "No."
> currow[curcols]
  V3     V5
"Name"  "No."
> cursub
  V6     V8
"Name"  "No."
> currow[curcols]
  V6     V8
"Name"  "No."
> cursub
  V9     V11
"Name"  "No."
> currow[curcols]
  V9     V11
"Name"  "No."
> cursub
  V12    V14
"Name"  "No."
> currow[curcols]
  V12    V14
"Name"  "No."
> cursub
  V15    V17
"Name"  "No."
> currow[curcols]
  V15    V17
"Name"  "No."
> cursub
  V18    V20
"Name"  "No."
> currow[curcols]
  V18    V20
"Name"  "No."

```

```

> cursub
  V21    V23
"Name"  "No."
> currow[curcols]
  V21    V23
"Name"  "No."
> cursub
  V24    V26
"Name"  "No."
> currow[curcols]
  V24    V26
"Name"  "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> matColLabel
      V3      V5      V6      V8      V9      V11
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      NA      NA      NA      NA      NA
[3,] NA      NA      NA      NA      NA      NA
[4,] "2004" NA      "2005" NA      "2006" NA
[5,] "Name" "No." "Name" "No." "Name" "No."
> res
$'2004'
$'2004'$rows
[1] 1 2

$'2004'$cols
[1] 5

$'2005'
$'2005'$rows
[1] 3 4

$'2005'$cols
[1] 5

$'2006'
$'2006'$rows
[1] 5 6

$'2006'$cols
[1] 5

```

```
$'2007'  
$'2007'$rows  
[1] 7 8
```

```
$'2007'$cols  
[1] 5
```

```
$'2008'  
$'2008'$rows  
[1] 9 10
```

```
$'2008'$cols  
[1] 5
```

```
$'2009'  
$'2009'$rows  
[1] 11 12
```

```
$'2009'$cols  
[1] 5
```

```
> plist  
$rows  
[1] 1 2
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  1   2
```

```
> plist  
$rows  
[1] 3 4
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  3   4
```

```
> plist  
$rows  
[1] 5 6
```

```
$cols  
[1] 5
```

```
> res  
Name No.  
  5   6
```

```
> plist  
$rows
```

```

[1] 7 8

$cols
[1] 5

> res
Name No.
    7    8
> plist
$rows
[1] 9 10

$cols
[1] 5

> res
Name No.
    9   10
> plist
$rows
[1] 11 12

$cols
[1] 5

> res
Name No.
   11   12
> plist
$rows
[1] 13 14

$cols
[1] 5

> res
Name No.
   13   14
> plist
$rows
[1] 15 16

$cols
[1] 5

> res
Name No.
   15   16
> plist
Name No.
    1    2
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma"    "352" "Emma"    "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella"    "292" "Ella"      "320"
[3,] "Ella"     "306" "Charlotte" "278" "Sophie"     "295"
[4,] "Sophie"   "299" "Olivia"   "274" "Emma"       "286"

```



```

[5,] "Hannah" "286" "Jessica" "257" "Olivia" "278"
[6,] "Emily" "282" "Sophie" "254" "Emily" "277"
> datbit
      V4      V5
[1,] "Emma" "352"
[2,] "Charlotte" "330"
[3,] "Ella" "306"
[4,] "Sophie" "299"
[5,] "Hannah" "286"
[6,] "Emily" "282"
> plist
Name No.
      3   4
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma" "352" "Emma" "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella" "292" "Ella" "320"
[3,] "Ella" "306" "Charlotte" "278" "Sophie" "295"
[4,] "Sophie" "299" "Olivia" "274" "Emma" "286"
[5,] "Hannah" "286" "Jessica" "257" "Olivia" "278"
[6,] "Emily" "282" "Sophie" "254" "Emily" "277"
> datbit
      V7      V8
[1,] "Emma" "315"
[2,] "Ella" "292"
[3,] "Charlotte" "278"
[4,] "Olivia" "274"
[5,] "Jessica" "257"
[6,] "Sophie" "254"
> plist
Name No.
      5   6
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma" "352" "Emma" "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella" "292" "Ella" "320"
[3,] "Ella" "306" "Charlotte" "278" "Sophie" "295"
[4,] "Sophie" "299" "Olivia" "274" "Emma" "286"
[5,] "Hannah" "286" "Jessica" "257" "Olivia" "278"
[6,] "Emily" "282" "Sophie" "254" "Emily" "277"
> datbit
      V10      V11
[1,] "Charlotte" "324"
[2,] "Ella" "320"
[3,] "Sophie" "295"
[4,] "Emma" "286"
[5,] "Olivia" "278"
[6,] "Emily" "277"
> plist
Name No.
      7   8
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma" "352" "Emma" "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella" "292" "Ella" "320"
[3,] "Ella" "306" "Charlotte" "278" "Sophie" "295"
[4,] "Sophie" "299" "Olivia" "274" "Emma" "286"

```

```

[5,] "Hannah"      "286" "Jessica"      "257" "Olivia"      "278"
[6,] "Emily"        "282" "Sophie"        "254" "Emily"        "277"
> datbit
      V13      V14
[1,] "Ella"      "418"
[2,] "Sophie"    "351"
[3,] "Olivia"    "285"
[4,] "Emma"      "280"
[5,] "Charlotte" "263"
[6,] "Emily"     "258"
> plist
Name No.
   9  10
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma"    "352" "Emma"    "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella"    "292" "Ella"      "320"
[3,] "Ella"    "306" "Charlotte" "278" "Sophie"    "295"
[4,] "Sophie"  "299" "Olivia"  "274" "Emma"      "286"
[5,] "Hannah" "286" "Jessica" "257" "Olivia"    "278"
[6,] "Emily"   "282" "Sophie"  "254" "Emily"     "277"
> datbit
      V16      V17
[1,] "Sophie"  "356"
[2,] "Olivia"  "308"
[3,] "Ella"    "297"
[4,] "Isabella" "288"
[5,] "Charlotte" "269"
[6,] "Lily"    "254"
> plist
Name No.
   11  12
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma"    "352" "Emma"    "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella"    "292" "Ella"      "320"
[3,] "Ella"    "306" "Charlotte" "278" "Sophie"    "295"
[4,] "Sophie"  "299" "Olivia"  "274" "Emma"      "286"
[5,] "Hannah" "286" "Jessica" "257" "Olivia"    "278"
[6,] "Emily"   "282" "Sophie"  "254" "Emily"     "277"
> datbit
      V19      V20
[1,] "Sophie"  "386"
[2,] "Ruby"    "305"
[3,] "Olivia"  "304"
[4,] "Isabella" "288"
[5,] "Ella"    "283"
[6,] "Emily"   "266"
> plist
Name No.
   13  14
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma"    "352" "Emma"    "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella"    "292" "Ella"      "320"
[3,] "Ella"    "306" "Charlotte" "278" "Sophie"    "295"
[4,] "Sophie"  "299" "Olivia"  "274" "Emma"      "286"

```

```

[5,] "Hannah"      "286" "Jessica"      "257" "Olivia"      "278"
[6,] "Emily"        "282" "Sophie"         "254" "Emily"        "277"
> datbit
      V22      V23
[1,] "Sophie"    "377"
[2,] "Olivia"    "335"
[3,] "Ruby"      "322"
[4,] "Charlotte" "305"
[5,] "Isabella"  "286"
[6,] "Lily"      "281"
> plist
Name No.
  15  16
> matData
      V4      V5      V7      V8      V10      V11
[1,] "Emma"    "352" "Emma"    "315" "Charlotte" "324"
[2,] "Charlotte" "330" "Ella"    "292" "Ella"      "320"
[3,] "Ella"     "306" "Charlotte" "278" "Sophie"    "295"
[4,] "Sophie"   "299" "Olivia"   "274" "Emma"      "286"
[5,] "Hannah"  "286" "Jessica"  "257" "Olivia"    "278"
[6,] "Emily"    "282" "Sophie"   "254" "Emily"     "277"
> datbit
      V25      V26
[1,] "Ruby"    "335"
[2,] "Olivia"  "324"
[3,] "Sophie"  "309"
[4,] "Isabella" "277"
[5,] "Charlotte" "258"
[6,] "Grace"   "246"
> colplist
$'2004'
+ Name (1, 5)
+ No. (2, 5)

$'2005'
+ Name (3, 5)
+ No. (4, 5)

$'2006'
+ Name (5, 5)
+ No. (6, 5)

$'2007'
+ Name (7, 5)
+ No. (8, 5)

$'2008'
+ Name (9, 5)
+ No. (10, 5)

$'2009'
+ Name (11, 5)
+ No. (12, 5)

> res
      UNKNOWN UNKNOWN      Name No.
1      2004      1      Emma 352

```

2	2004	2	Charlotte	330
3	2004	3	Ella	306
4	2004	4	Sophie	299
5	2004	5	Hannah	286
6	2004	6	Emily	282

8.3 NZQAScholarships.xls

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Scholarship Entries and Results by Gender and Ethnicity (Broken down by Decile)												
2													
3				Decile 1-3									Decile 4-7
4			# of	#	#		#	# Not	#	#		# of	#
5	Results		Entries	Absent	SNA		Assessed	Achieved	Scholarship	Outstanding		Entries	Absent
6													
7	All Subjects		714	148	13		553	462	81	10		6,482	1,772
8													
9	Accounting		22	4	0		18	16	2	0		156	41
10	NZ Maori	Male	2	1	0		1	1	0	0		2	1
11		Female	0	0	0		0	0	0	0		7	2
12	NZ European	Male	2	0	0		2	1	1	0		51	13
13		Female	3	0	0		3	2	1	0		44	12
14		Unknown	0	0	0		0	0	0	0		0	0
15	Pasifika Pacific	Male	2	0	0		2	2	0	0		3	0
16		Female	6	2	0		4	4	0	0		4	2
17	Asian	Male	5	0	0		5	5	0	0		29	4
18		Female	2	1	0		1	1	0	0		15	7
19	Other/Unspecified	Male	0	0	0		0	0	0	0		0	0
20		Female	0	0	0		0	0	0	0		1	0
21													
22	Agricultural & Horticulture		0	0	0		0	0	0	0		15	3
23	NZ Maori	Male	0	0	0		0	0	0	0		0	0
24		Female	0	0	0		0	0	0	0		0	0
25	NZ European	Male	0	0	0		0	0	0	0		10	1
26		Female	0	0	0		0	0	0	0		5	2
27		Unknown	0	0	0		0	0	0	0		0	0
28	Pasifika Pacific	Male	0	0	0		0	0	0	0		0	0
29		Female	0	0	0		0	0	0	0		0	0
30	Asian	Male	0	0	0		0	0	0	0		0	0
31		Female	0	0	0		0	0	0	0		0	0
32	Other/Unspecified	Male	0	0	0		0	0	0	0		0	0
33		Female	0	0	0		0	0	0	0		0	0
34													
35	Art History		6	1	0		5	5	0	0		87	23
36	NZ Maori	Male	0	0	0		0	0	0	0		1	0
37		Female	2	0	0		2	2	0	0		4	1
38	NZ European	Male	1	1	0		0	0	0	0		7	2
39		Female	3	0	0		3	3	0	0		60	17
40		Unknown	0	0	0		0	0	0	0		0	0
41	Pasifika Pacific	Male	0	0	0		0	0	0	0		0	0
42		Female	0	0	0		0	0	0	0		0	0
43	Asian	Male	0	0	0		0	0	0	0		3	0

```
> rowData
[1] 7 462
> colData
[1] 3 28
> rowslist
$label
[1] 1 3 4 5
```

```
$data
[1] 7 9 10 11 12 13 14 15 16 17 18 19 20 22 23 24 25 26
[19] 27 28 29 30 31 32 33 35 36 37 38 39 40 41 42 43 44 45
[37] 46 48 49 50 51 52 53 54 55 56 57 58 59 61 62 63 64 65
[55] 66 67 68 69 70 71 72 74 75 76 77 78 79 80 81 82 83 84
[73] 85 87 88 89 90 91 92 93 94 95 96 97 98 100 101 102 103 104
[91] 105 106 107 108 109 110 111 113 114 115 116 117 118 119 120 121 122 123
[109] 124 126 127 128 129 130 131 132 133 134 135 136 137 139 140 141 142 143
[127] 144 145 146 147 148 149 150 152 153 154 155 156 157 158 159 160 161 162
[145] 163 165 166 167 168 169 170 171 172 173 174 175 176 178 179 180 181 182
[163] 183 184 185 186 187 188 189 191 192 193 194 195 196 197 198 199 200 201
[181] 202 204 205 206 207 208 209 210 211 212 213 214 215 217 218 219 220 221
[199] 222 223 224 225 226 227 228 230 231 232 233 234 235 236 237 238 239 240
[217] 241 243 244 245 246 247 248 249 250 251 252 253 254 256 257 258 259 260
[235] 261 262 263 264 265 266 267 269 270 271 272 273 274 275 276 277 278 279
[253] 280 282 283 284 285 286 287 288 289 290 291 292 293 295 296 297 298 299
[271] 300 301 302 303 304 305 306 308 309 310 311 312 313 314 315 316 317 318
[289] 319 321 322 323 324 325 326 327 328 329 330 331 332 334 335 336 337 338
```

```
[307] 339 340 341 342 343 344 345 347 348 349 350 351 352 353 354 355 356 357
[325] 358 360 361 362 363 364 365 366 367 368 369 370 371 373 374 375 376 377
[343] 378 379 380 381 382 383 384 386 387 388 389 390 391 392 393 394 395 396
[361] 397 399 400 401 402 403 404 405 406 407 408 409 410 412 413 414 415 416
[379] 417 418 419 420 421 422 423 425 426 427 428 429 430 431 432 433 434 435
[397] 436 438 439 440 441 442 443 444 445 446 447 448 449 451 452 453 454 455
[415] 456 457 458 459 460 461 462
```

```
> colslist
$label
[1] 1 2
```

```
$data
[1] 3 4 5 7 8 9 10 12 13 14 16 17 18 19 21 22 23 25 26 27 28
```

```
> res
$'All Subjects'
$'All Subjects'$rows
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
[19] 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
[37] 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
[55] 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73
[73] 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91
[91] 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109
[109] 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
[127] 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145
[145] 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163
[163] 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181
[181] 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199
[199] 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217
[217] 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235
[235] 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253
[253] 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271
[271] 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289
[289] 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307
[307] 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325
[325] 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343
[343] 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361
[361] 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379
[379] 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397
[397] 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415
[415] 416 417 418 419 420 421
```

```
$'All Subjects'$cols
[1] 1 2
```

```
> res
$Accounting
$Accounting$rows
[1] 3 4 5 6 7 8 9 10 11 12 13
```

```
$Accounting$cols
[1] 1 2
```

```
$'Agricultural & Horticultural Science'
```

```
$'Agricultural & Horticultural Science'$rows  
[1] 15 16 17 18 19 20 21 22 23 24 25
```

```
$'Agricultural & Horticultural Science'$cols  
[1] 1 2
```

```
$'Art History'  
$'Art History'$rows  
[1] 27 28 29 30 31 32 33 34 35 36 37
```

```
$'Art History'$cols  
[1] 1 2
```

```
$Biology  
$Biology$rows  
[1] 39 40 41 42 43 44 45 46 47 48 49
```

```
$Biology$cols  
[1] 1 2
```

```
$Chemistry  
$Chemistry$rows  
[1] 51 52 53 54 55 56 57 58 59 60 61
```

```
$Chemistry$cols  
[1] 1 2
```

```
$Chinese  
$Chinese$rows  
[1] 63 64 65 66 67 68 69 70 71 72 73
```

```
$Chinese$cols  
[1] 1 2
```

```
> res  
$'NZ Maori'  
$'NZ Maori'$rows  
[1] 3 4
```

```
$'NZ Maori'$cols  
[1] 2
```

```
$'NZ European'  
$'NZ European'$rows  
[1] 5 6 7
```

```
$'NZ European'$cols  
[1] 2
```

```
$'Pasifika Peoples'
```

```

$'Pasifika Peoples'$rows
[1] 8 9

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 10 11

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 12 13

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 3 4

$cols
[1] 2

> res
  Male Female
    3      4
> plist
$rows
[1] 5 6 7

$cols
[1] 2

> res
  Male  Female Unknown
    5      6      7
> plist
$rows
[1] 8 9

$cols
[1] 2

> res
  Male Female
    8      9
> plist
$rows
[1] 10 11

```



```

$cols
[1] 2

> res
  Male Female
    10     11
> plist
$rows
[1] 12 13

$cols
[1] 2

> res
  Male Female
    12     13
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 15 16

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 17 18 19

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 20 21

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 22 23

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 24 25

$'Other/Unspecified Ethnicity'$cols
[1] 2

```

```

> plist
$rows
[1] 15 16

$cols
[1] 2

> res
  Male Female
    15     16
> plist
$rows
[1] 17 18 19

$cols
[1] 2

> res
  Male  Female Unknown
    17     18     19
> plist
$rows
[1] 20 21

$cols
[1] 2

> res
  Male Female
    20     21
> plist
$rows
[1] 22 23

$cols
[1] 2

> res
  Male Female
    22     23
> plist
$rows
[1] 24 25

$cols
[1] 2

> res
  Male Female
    24     25
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 27 28

$'NZ Maori'$cols
[1] 2

```

```

$'NZ European'
$'NZ European'$rows
[1] 29 30 31

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 32 33

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 34 35

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 36 37

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 27 28

$cols
[1] 2

> res
  Male Female
    27    28
> plist
$rows
[1] 29 30 31

$cols
[1] 2

> res
  Male Female Unknown
    29    30    31
> plist
$rows
[1] 32 33

```

```

$cols
[1] 2

> res
  Male Female
    32     33
> plist
$rows
[1] 34 35

$cols
[1] 2

> res
  Male Female
    34     35
> plist
$rows
[1] 36 37

$cols
[1] 2

> res
  Male Female
    36     37
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 39 40

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 41 42 43

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 44 45

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 46 47

$Asian$cols

```

```

[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 48 49

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 39 40

$cols
[1] 2

> res
  Male Female
    39     40
> plist
$rows
[1] 41 42 43

$cols
[1] 2

> res
  Male  Female Unknown
    41     42     43
> plist
$rows
[1] 44 45

$cols
[1] 2

> res
  Male Female
    44     45
> plist
$rows
[1] 46 47

$cols
[1] 2

> res
  Male Female
    46     47
> plist
$rows
[1] 48 49

$cols
[1] 2

```

```

> res
  Male Female
    48      49
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 51 52

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 53 54 55

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 56 57

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 58 59

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 60 61

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 51 52

$cols
[1] 2

> res
  Male Female
    51      52
> plist
$rows

```

```

[1] 53 54 55

$cols
[1] 2

> res
      Male Female Unknown
      53      54      55
> plist
$rows
[1] 56 57

$cols
[1] 2

> res
      Male Female
      56      57
> plist
$rows
[1] 58 59

$cols
[1] 2

> res
      Male Female
      58      59
> plist
$rows
[1] 60 61

$cols
[1] 2

> res
      Male Female
      60      61
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 63 64

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 65 66 67

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows

```

```

[1] 68 69

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 70 71

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 72 73

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 63 64

$cols
[1] 2

> res
  Male Female
    63     64
> plist
$rows
[1] 65 66 67

$cols
[1] 2

> res
  Male  Female Unknown
    65     66     67
> plist
$rows
[1] 68 69

$cols
[1] 2

> res
  Male Female
    68     69
> plist
$rows
[1] 70 71

$cols

```



```

[1] 2

> res
  Male Female
    70      71
> plist
$rows
[1] 72 73

$cols
[1] 2

> res
  Male Female
    72      73
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 75 76

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 77 78 79

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 80 81

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 82 83

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 84 85

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist

```

```

$rows
[1] 75 76

$cols
[1] 2

> res
  Male Female
    75     76
> plist
$rows
[1] 77 78 79

$cols
[1] 2

> res
  Male Female Unknown
    77     78     79
> plist
$rows
[1] 80 81

$cols
[1] 2

> res
  Male Female
    80     81
> plist
$rows
[1] 82 83

$cols
[1] 2

> res
  Male Female
    82     83
> plist
$rows
[1] 84 85

$cols
[1] 2

> res
  Male Female
    84     85
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 87 88

$'NZ Maori'$cols
[1] 2

```

```

$'NZ European'
$'NZ European'$rows
[1] 89 90 91

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 92 93

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 94 95

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 96 97

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 87 88

$cols
[1] 2

> res
  Male Female
    87    88
> plist
$rows
[1] 89 90 91

$cols
[1] 2

> res
  Male Female Unknown
    89    90    91
> plist
$rows
[1] 92 93

```

```

$cols
[1] 2

> res
  Male Female
    92     93
> plist
$rows
[1] 94 95

$cols
[1] 2

> res
  Male Female
    94     95
> plist
$rows
[1] 96 97

$cols
[1] 2

> res
  Male Female
    96     97
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 99 100

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 101 102 103

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 104 105

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 106 107

$Asian$cols
[1] 2

```

```
$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 108 109
```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2
```

```
> plist
$rows
[1] 99 100
```

```
$cols
[1] 2
```

```
> res
  Male Female
    99    100
```

```
> plist
$rows
[1] 101 102 103
```

```
$cols
[1] 2
```

```
> res
  Male Female Unknown
    101    102    103
```

```
> plist
$rows
[1] 104 105
```

```
$cols
[1] 2
```

```
> res
  Male Female
    104    105
```

```
> plist
$rows
[1] 106 107
```

```
$cols
[1] 2
```

```
> res
  Male Female
    106    107
```

```
> plist
$rows
[1] 108 109
```

```
$cols
[1] 2
```

```

> res
  Male Female
    108     109
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 111 112

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 113 114 115

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 116 117

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 118 119

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 120 121

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 111 112

$cols
[1] 2

> res
  Male Female
    111     112
> plist
$rows
[1] 113 114 115

```

```

$cols
[1] 2

> res
      Male Female Unknown
      113     114     115
> plist
$rows
[1] 116 117

$cols
[1] 2

> res
      Male Female
      116     117
> plist
$rows
[1] 118 119

$cols
[1] 2

> res
      Male Female
      118     119
> plist
$rows
[1] 120 121

$cols
[1] 2

> res
      Male Female
      120     121
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 123 124

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 125 126 127

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 128 129

```

```

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 130 131

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 132 133

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 123 124

$cols
[1] 2

> res
  Male Female
   123    124
> plist
$rows
[1] 125 126 127

$cols
[1] 2

> res
  Male  Female Unknown
   125    126    127
> plist
$rows
[1] 128 129

$cols
[1] 2

> res
  Male Female
   128    129
> plist
$rows
[1] 130 131

$cols
[1] 2

```



```

> res
  Male Female
    130     131
> plist
$rows
[1] 132 133

$cols
[1] 2

> res
  Male Female
    132     133
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 135 136

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 137 138 139

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 140 141

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 142 143

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 144 145

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows

```

```

[1] 135 136

$cols
[1] 2

> res
  Male Female
  135    136
> plist
$rows
[1] 137 138 139

$cols
[1] 2

> res
  Male Female Unknown
  137    138    139
> plist
$rows
[1] 140 141

$cols
[1] 2

> res
  Male Female
  140    141
> plist
$rows
[1] 142 143

$cols
[1] 2

> res
  Male Female
  142    143
> plist
$rows
[1] 144 145

$cols
[1] 2

> res
  Male Female
  144    145
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 147 148

$'NZ Maori'$cols
[1] 2

```

```

$'NZ European'
$'NZ European'$rows
[1] 149 150 151

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 152 153

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 154 155

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 156 157

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 147 148

$cols
[1] 2

> res
  Male Female
    147    148
> plist
$rows
[1] 149 150 151

$cols
[1] 2

> res
  Male Female Unknown
    149    150    151
> plist
$rows
[1] 152 153

$cols

```

```

[1] 2

> res
  Male Female
    152     153
> plist
$rows
[1] 154 155

$cols
[1] 2

> res
  Male Female
    154     155
> plist
$rows
[1] 156 157

$cols
[1] 2

> res
  Male Female
    156     157
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 159 160

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 161 162 163

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 164 165

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 166 167

$Asian$cols
[1] 2

```

```
$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 168 169
```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2
```

```
> plist
$rows
[1] 159 160
```

```
$cols
[1] 2
```

```
> res
  Male Female
    159    160
> plist
$rows
[1] 161 162 163
```

```
$cols
[1] 2
```

```
> res
  Male Female Unknown
    161    162    163
> plist
$rows
[1] 164 165
```

```
$cols
[1] 2
```

```
> res
  Male Female
    164    165
> plist
$rows
[1] 166 167
```

```
$cols
[1] 2
```

```
> res
  Male Female
    166    167
> plist
$rows
[1] 168 169
```

```
$cols
[1] 2
```

```
> res
```

```

      Male Female
      168      169
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 171 172

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 173 174 175

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 176 177

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 178 179

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 180 181

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 171 172

$cols
[1] 2

> res
      Male Female
      171      172
> plist
$rows
[1] 173 174 175

```

```

$cols
[1] 2

> res
      Male Female Unknown
      173     174     175
> plist
$rows
[1] 176 177

$cols
[1] 2

> res
      Male Female
      176     177
> plist
$rows
[1] 178 179

$cols
[1] 2

> res
      Male Female
      178     179
> plist
$rows
[1] 180 181

$cols
[1] 2

> res
      Male Female
      180     181
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 183 184

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 185 186 187

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 188 189

```

```
$'Pasifika Peoples'$cols  
[1] 2
```

```
$Asian  
$Asian$rows  
[1] 190 191
```

```
$Asian$cols  
[1] 2
```

```
$'Other/Unspecified Ethnicity'  
$'Other/Unspecified Ethnicity'$rows  
[1] 192 193
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2
```

```
> plist  
$rows  
[1] 183 184
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  183    184  
> plist  
$rows  
[1] 185 186 187
```

```
$cols  
[1] 2
```

```
> res  
  Male Female Unknown  
  185    186    187  
> plist  
$rows  
[1] 188 189
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  188    189  
> plist  
$rows  
[1] 190 191
```

```
$cols  
[1] 2
```



```

> res
  Male Female
    190     191
> plist
$rows
[1] 192 193

$cols
[1] 2

> res
  Male Female
    192     193
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 195 196

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 197 198 199

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 200 201

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 202 203

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 204 205

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 195 196

```

```

$cols
[1] 2

> res
  Male Female
  195    196
> plist
$rows
[1] 197 198 199

$cols
[1] 2

> res
  Male  Female Unknown
  197    198    199
> plist
$rows
[1] 200 201

$cols
[1] 2

> res
  Male Female
  200    201
> plist
$rows
[1] 202 203

$cols
[1] 2

> res
  Male Female
  202    203
> plist
$rows
[1] 204 205

$cols
[1] 2

> res
  Male Female
  204    205
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 207 208

$'NZ Maori'$cols
[1] 2

$'NZ European'

```

```

$'NZ European'$rows
[1] 209 210 211

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 212 213

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 214 215

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 216 217

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 207 208

$cols
[1] 2

> res
  Male Female
    207    208
> plist
$rows
[1] 209 210 211

$cols
[1] 2

> res
  Male  Female Unknown
    209    210    211
> plist
$rows
[1] 212 213

$cols
[1] 2

```

```

> res
  Male Female
    212     213
> plist
$rows
[1] 214 215

$cols
[1] 2

> res
  Male Female
    214     215
> plist
$rows
[1] 216 217

$cols
[1] 2

> res
  Male Female
    216     217
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 219 220

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 221 222 223

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 224 225

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 226 227

$Asian$cols
[1] 2

```

```
$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 228 229
```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2
```

```
> plist
$rows
[1] 219 220
```

```
$cols
[1] 2
```

```
> res
  Male Female
  219    220
```

```
> plist
$rows
[1] 221 222 223
```

```
$cols
[1] 2
```

```
> res
  Male Female Unknown
  221    222    223
```

```
> plist
$rows
[1] 224 225
```

```
$cols
[1] 2
```

```
> res
  Male Female
  224    225
```

```
> plist
$rows
[1] 226 227
```

```
$cols
[1] 2
```

```
> res
  Male Female
  226    227
```

```
> plist
$rows
[1] 228 229
```

```
$cols
[1] 2
```

```
> res
  Male Female
```

```

      228      229
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 231 232

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 233 234 235

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 236 237

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 238 239

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 240 241

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 231 232

$cols
[1] 2

> res
  Male Female
    231    232
> plist
$rows
[1] 233 234 235

$cols

```

```

[1] 2

> res
      Male Female Unknown
      233     234     235
> plist
$rows
[1] 236 237

$cols
[1] 2

> res
      Male Female
      236     237
> plist
$rows
[1] 238 239

$cols
[1] 2

> res
      Male Female
      238     239
> plist
$rows
[1] 240 241

$cols
[1] 2

> res
      Male Female
      240     241
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 243 244

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 245 246 247

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 248 249

$'Pasifika Peoples'$cols

```

```

[1] 2

$Asian
$Asian$rows
[1] 250 251

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 252 253

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 243 244

$cols
[1] 2

> res
  Male Female
    243    244
> plist
$rows
[1] 245 246 247

$cols
[1] 2

> res
  Male  Female Unknown
    245    246    247
> plist
$rows
[1] 248 249

$cols
[1] 2

> res
  Male Female
    248    249
> plist
$rows
[1] 250 251

$cols
[1] 2

> res

```



```

      Male Female
      250      251
> plist
$rows
[1] 252 253

$cols
[1] 2

> res
      Male Female
      252      253
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 255 256

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 257 258 259

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 260 261

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 262 263

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 264 265

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 255 256

```

```

$cols
[1] 2

> res
  Male Female
  255     256
> plist
$rows
[1] 257 258 259

$cols
[1] 2

> res
  Male Female Unknown
  257     258     259
> plist
$rows
[1] 260 261

$cols
[1] 2

> res
  Male Female
  260     261
> plist
$rows
[1] 262 263

$cols
[1] 2

> res
  Male Female
  262     263
> plist
$rows
[1] 264 265

$cols
[1] 2

> res
  Male Female
  264     265
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 267 268

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows

```

```

[1] 269 270 271

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 272 273

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 274 275

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 276 277

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 267 268

$cols
[1] 2

> res
  Male Female
    267    268
> plist
$rows
[1] 269 270 271

$cols
[1] 2

> res
  Male  Female Unknown
    269    270    271
> plist
$rows
[1] 272 273

$cols
[1] 2

```

```

> res
  Male Female
    272     273
> plist
$rows
[1] 274 275

$cols
[1] 2

> res
  Male Female
    274     275
> plist
$rows
[1] 276 277

$cols
[1] 2

> res
  Male Female
    276     277
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 279 280

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 281 282 283

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 284 285

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 286 287

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'

```

```
$'Other/Unspecified Ethnicity'$rows  
[1] 288 289
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2
```

```
> plist  
$rows  
[1] 279 280
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  279    280  
> plist  
$rows  
[1] 281 282 283
```

```
$cols  
[1] 2
```

```
> res  
  Male Female Unknown  
  281    282    283  
> plist  
$rows  
[1] 284 285
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  284    285  
> plist  
$rows  
[1] 286 287
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  286    287  
> plist  
$rows  
[1] 288 289
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  288    289
```

```

> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 291 292

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 293 294 295

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 296 297

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 298 299

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 300 301

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 291 292

$cols
[1] 2

> res
  Male Female
    291    292
> plist
$rows
[1] 293 294 295

$cols
[1] 2

```

```

> res
      Male Female Unknown
      293     294     295
> plist
$rows
[1] 296 297

$cols
[1] 2

> res
      Male Female
      296     297
> plist
$rows
[1] 298 299

$cols
[1] 2

> res
      Male Female
      298     299
> plist
$rows
[1] 300 301

$cols
[1] 2

> res
      Male Female
      300     301
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 303 304

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 305 306 307

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 308 309

$'Pasifika Peoples'$cols
[1] 2

```

```

$Asian
$Asian$rows
[1] 310 311

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 312 313

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 303 304

$cols
[1] 2

> res
  Male Female
    303    304
> plist
$rows
[1] 305 306 307

$cols
[1] 2

> res
  Male  Female Unknown
    305    306    307
> plist
$rows
[1] 308 309

$cols
[1] 2

> res
  Male Female
    308    309
> plist
$rows
[1] 310 311

$cols
[1] 2

> res
  Male Female

```



```

      310      311
> plist
$rows
[1] 312 313

$cols
[1] 2

> res
  Male Female
  312      313
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 315 316

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 317 318 319

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 320 321

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 322 323

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 324 325

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 315 316

$cols

```

```

[1] 2

> res
  Male Female
    315    316
> plist
$rows
[1] 317 318 319

$cols
[1] 2

> res
  Male Female Unknown
    317    318    319
> plist
$rows
[1] 320 321

$cols
[1] 2

> res
  Male Female
    320    321
> plist
$rows
[1] 322 323

$cols
[1] 2

> res
  Male Female
    322    323
> plist
$rows
[1] 324 325

$cols
[1] 2

> res
  Male Female
    324    325
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 327 328

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 329 330 331

```

```
$'NZ European'$cols  
[1] 2
```

```
$'Pasifika Peoples'  
$'Pasifika Peoples'$rows  
[1] 332 333
```

```
$'Pasifika Peoples'$cols  
[1] 2
```

```
$Asian  
$Asian$rows  
[1] 334 335
```

```
$Asian$cols  
[1] 2
```

```
$'Other/Unspecified Ethnicity'  
$'Other/Unspecified Ethnicity'$rows  
[1] 336 337
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2
```

```
> plist  
$rows  
[1] 327 328
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  327   328  
> plist  
$rows  
[1] 329 330 331
```

```
$cols  
[1] 2
```

```
> res  
  Male Female Unknown  
  329   330   331  
> plist  
$rows  
[1] 332 333
```

```
$cols  
[1] 2
```

```
> res
```

```

      Male Female
      332      333
> plist
$rows
[1] 334 335

$cols
[1] 2

> res
      Male Female
      334      335
> plist
$rows
[1] 336 337

$cols
[1] 2

> res
      Male Female
      336      337
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 339 340

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 341 342 343

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 344 345

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 346 347

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows

```

```

[1] 348 349

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 339 340

$cols
[1] 2

> res
  Male Female
  339    340
> plist
$rows
[1] 341 342 343

$cols
[1] 2

> res
  Male Female Unknown
  341    342    343
> plist
$rows
[1] 344 345

$cols
[1] 2

> res
  Male Female
  344    345
> plist
$rows
[1] 346 347

$cols
[1] 2

> res
  Male Female
  346    347
> plist
$rows
[1] 348 349

$cols
[1] 2

> res
  Male Female
  348    349
> res

```

```
$'NZ Maori'
$'NZ Maori'$rows
[1] 351 352
```

```
$'NZ Maori'$cols
[1] 2
```

```
$'NZ European'
$'NZ European'$rows
[1] 353 354 355
```

```
$'NZ European'$cols
[1] 2
```

```
$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 356 357
```

```
$'Pasifika Peoples'$cols
[1] 2
```

```
$Asian
$Asian$rows
[1] 358 359
```

```
$Asian$cols
[1] 2
```

```
$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 360 361
```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2
```

```
> plist
$rows
[1] 351 352
```

```
$cols
[1] 2
```

```
> res
  Male Female
    351    352
```

```
> plist
$rows
[1] 353 354 355
```

```
$cols
[1] 2
```

```

> res
      Male Female Unknown
      353     354     355
> plist
$rows
[1] 356 357

$cols
[1] 2

> res
      Male Female
      356     357
> plist
$rows
[1] 358 359

$cols
[1] 2

> res
      Male Female
      358     359
> plist
$rows
[1] 360 361

$cols
[1] 2

> res
      Male Female
      360     361
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 363 364

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 365 366 367

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 368 369

$'Pasifika Peoples'$cols
[1] 2

```

```

$Asian
$Asian$rows
[1] 370 371

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 372 373

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 363 364

$cols
[1] 2

> res
  Male Female
  363    364
> plist
$rows
[1] 365 366 367

$cols
[1] 2

> res
  Male  Female Unknown
  365    366    367
> plist
$rows
[1] 368 369

$cols
[1] 2

> res
  Male Female
  368    369
> plist
$rows
[1] 370 371

$cols
[1] 2

> res
  Male Female
  370    371

```



```

> plist
$rows
[1] 372 373

$cols
[1] 2

> res
  Male Female
  372     373
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 375 376

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 377 378 379

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 380 381

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 382 383

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 384 385

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 375 376

$cols
[1] 2

```

```

> res
  Male Female
    375    376
> plist
$rows
[1] 377 378 379

$cols
[1] 2

> res
  Male Female Unknown
    377    378    379
> plist
$rows
[1] 380 381

$cols
[1] 2

> res
  Male Female
    380    381
> plist
$rows
[1] 382 383

$cols
[1] 2

> res
  Male Female
    382    383
> plist
$rows
[1] 384 385

$cols
[1] 2

> res
  Male Female
    384    385
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 387 388

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 389 390 391

```

```

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 392 393

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 394 395

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 396 397

$'Other/Unspecified Ethnicity'$cols
[1] 2

> plist
$rows
[1] 387 388

$cols
[1] 2

> res
  Male Female
    387    388
> plist
$rows
[1] 389 390 391

$cols
[1] 2

> res
  Male  Female Unknown
    389    390    391
> plist
$rows
[1] 392 393

$cols
[1] 2

> res
  Male Female
    389    390

```

```

      392      393
> plist
$rows
[1] 394 395

$cols
[1] 2

> res
  Male Female
  394      395
> plist
$rows
[1] 396 397

$cols
[1] 2

> res
  Male Female
  396      397
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 399 400

$'NZ Maori'$cols
[1] 2

$'NZ European'
$'NZ European'$rows
[1] 401 402 403

$'NZ European'$cols
[1] 2

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 404 405

$'Pasifika Peoples'$cols
[1] 2

$Asian
$Asian$rows
[1] 406 407

$Asian$cols
[1] 2

$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 408 409

```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2
```

```
> plist
$rows
[1] 399 400
```

```
$cols
[1] 2
```

```
> res
  Male Female
  399    400
> plist
$rows
[1] 401 402 403
```

```
$cols
[1] 2
```

```
> res
  Male Female Unknown
  401    402    403
> plist
$rows
[1] 404 405
```

```
$cols
[1] 2
```

```
> res
  Male Female
  404    405
> plist
$rows
[1] 406 407
```

```
$cols
[1] 2
```

```
> res
  Male Female
  406    407
> plist
$rows
[1] 408 409
```

```
$cols
[1] 2
```

```
> res
  Male Female
  408    409
```

```
> res
$'NZ Maori'
```

```
$'NZ Maori'$rows  
[1] 411 412
```

```
$'NZ Maori'$cols  
[1] 2
```

```
$'NZ European'  
$'NZ European'$rows  
[1] 413 414 415
```

```
$'NZ European'$cols  
[1] 2
```

```
$'Pasifika Peoples'  
$'Pasifika Peoples'$rows  
[1] 416 417
```

```
$'Pasifika Peoples'$cols  
[1] 2
```

```
$Asian  
$Asian$rows  
[1] 418 419
```

```
$Asian$cols  
[1] 2
```

```
$'Other/Unspecified Ethnicity'  
$'Other/Unspecified Ethnicity'$rows  
[1] 420 421
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2
```

```
> plist  
$rows  
[1] 411 412
```

```
$cols  
[1] 2
```

```
> res  
  Male Female  
  411     412
```

```
> plist  
$rows  
[1] 413 414 415
```

```
$cols  
[1] 2
```

```
> res
```

```

      Male Female Unknown
      413     414     415
> plist
$rows
[1] 416 417

$cols
[1] 2

> res
      Male Female
      416     417
> plist
$rows
[1] 418 419

$cols
[1] 2

> res
      Male Female
      418     419
> plist
$rows
[1] 420 421

$cols
[1] 2

> res
      Male Female
      420     421
> rowplist
$'All Subjects'
+ Accounting (2, 1)
- + NZ Maori (3, 1)
- - + Male (3, 2)
- - + Female (4, 2)
- + NZ European (5, 1)
- - + Male (5, 2)
- - + Female (6, 2)
- - + Unknown (7, 2)
- + Pasifika Peoples (8, 1)
- - + Male (8, 2)
- - + Female (9, 2)
- + Asian (10, 1)
- - + Male (10, 2)
- - + Female (11, 2)
- + Other/Unspecified Ethnicity (12, 1)
- - + Male (12, 2)
- - + Female (13, 2)
+ Agricultural & Horticultural Science (14, 1)
- + NZ Maori (15, 1)
- - + Male (15, 2)
- - + Female (16, 2)
- + NZ European (17, 1)
- - + Male (17, 2)

```

- - + Female (18, 2)
- - + Unknown (19, 2)
- + Pasifika Peoples (20, 1)
- - + Male (20, 2)
- - + Female (21, 2)
- + Asian (22, 1)
- - + Male (22, 2)
- - + Female (23, 2)
- + Other/Unspecified Ethnicity (24, 1)
- - + Male (24, 2)
- - + Female (25, 2)
- + Art History (26, 1)
- + NZ Maori (27, 1)
- - + Male (27, 2)
- - + Female (28, 2)
- + NZ European (29, 1)
- - + Male (29, 2)
- - + Female (30, 2)
- - + Unknown (31, 2)
- + Pasifika Peoples (32, 1)
- - + Male (32, 2)
- - + Female (33, 2)
- + Asian (34, 1)
- - + Male (34, 2)
- - + Female (35, 2)
- + Other/Unspecified Ethnicity (36, 1)
- - + Male (36, 2)
- - + Female (37, 2)
- + Biology (38, 1)
- + NZ Maori (39, 1)
- - + Male (39, 2)
- - + Female (40, 2)
- + NZ European (41, 1)
- - + Male (41, 2)
- - + Female (42, 2)
- - + Unknown (43, 2)
- + Pasifika Peoples (44, 1)
- - + Male (44, 2)
- - + Female (45, 2)
- + Asian (46, 1)
- - + Male (46, 2)
- - + Female (47, 2)
- + Other/Unspecified Ethnicity (48, 1)
- - + Male (48, 2)
- - + Female (49, 2)
- + Chemistry (50, 1)
- + NZ Maori (51, 1)
- - + Male (51, 2)
- - + Female (52, 2)
- + NZ European (53, 1)
- - + Male (53, 2)
- - + Female (54, 2)
- - + Unknown (55, 2)
- + Pasifika Peoples (56, 1)
- - + Male (56, 2)
- - + Female (57, 2)
- + Asian (58, 1)

- - + Male (58, 2)
- - + Female (59, 2)
- + Other/Unspecified Ethnicity (60, 1)
- - + Male (60, 2)
- - + Female (61, 2)
- + Chinese (62, 1)
- + NZ Maori (63, 1)
- - + Male (63, 2)
- - + Female (64, 2)
- + NZ European (65, 1)
- - + Male (65, 2)
- - + Female (66, 2)
- - + Unknown (67, 2)
- + Pasifika Peoples (68, 1)
- - + Male (68, 2)
- - + Female (69, 2)
- + Asian (70, 1)
- - + Male (70, 2)
- - + Female (71, 2)
- + Other/Unspecified Ethnicity (72, 1)
- - + Male (72, 2)
- - + Female (73, 2)
- + Classical Studies (74, 1)
- + NZ Maori (75, 1)
- - + Male (75, 2)
- - + Female (76, 2)
- + NZ European (77, 1)
- - + Male (77, 2)
- - + Female (78, 2)
- - + Unknown (79, 2)
- + Pasifika Peoples (80, 1)
- - + Male (80, 2)
- - + Female (81, 2)
- + Asian (82, 1)
- - + Male (82, 2)
- - + Female (83, 2)
- + Other/Unspecified Ethnicity (84, 1)
- - + Male (84, 2)
- - + Female (85, 2)
- + Dance (86, 1)
- + NZ Maori (87, 1)
- - + Male (87, 2)
- - + Female (88, 2)
- + NZ European (89, 1)
- - + Male (89, 2)
- - + Female (90, 2)
- - + Unknown (91, 2)
- + Pasifika Peoples (92, 1)
- - + Male (92, 2)
- - + Female (93, 2)
- + Asian (94, 1)
- - + Male (94, 2)
- - + Female (95, 2)
- + Other/Unspecified Ethnicity (96, 1)
- - + Male (96, 2)
- - + Female (97, 2)
- + Design and Visual Communication (98, 1)

- + NZ Maori (99, 1)
- - + Male (99, 2)
- - + Female (100, 2)
- + NZ European (101, 1)
- - + Male (101, 2)
- - + Female (102, 2)
- - + Unknown (103, 2)
- + Pasifika Peoples (104, 1)
- - + Male (104, 2)
- - + Female (105, 2)
- + Asian (106, 1)
- - + Male (106, 2)
- - + Female (107, 2)
- + Other/Unspecified Ethnicity (108, 1)
- - + Male (108, 2)
- - + Female (109, 2)
- + Drama (110, 1)
- + NZ Maori (111, 1)
- - + Male (111, 2)
- - + Female (112, 2)
- + NZ European (113, 1)
- - + Male (113, 2)
- - + Female (114, 2)
- - + Unknown (115, 2)
- + Pasifika Peoples (116, 1)
- - + Male (116, 2)
- - + Female (117, 2)
- + Asian (118, 1)
- - + Male (118, 2)
- - + Female (119, 2)
- + Other/Unspecified Ethnicity (120, 1)
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- - + Female (121, 2)
- + Economics (122, 1)
- + NZ Maori (123, 1)
- - + Male (123, 2)
- - + Female (124, 2)
- + NZ European (125, 1)
- - + Male (125, 2)
- - + Female (126, 2)
- - + Unknown (127, 2)
- + Pasifika Peoples (128, 1)
- - + Male (128, 2)
- - + Female (129, 2)
- + Asian (130, 1)
- - + Male (130, 2)
- - + Female (131, 2)
- + Other/Unspecified Ethnicity (132, 1)
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- - + Female (133, 2)
- + English (134, 1)
- + NZ Maori (135, 1)
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- - + Female (136, 2)
- + NZ European (137, 1)
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- - + Female (138, 2)

- - + Unknown (139, 2)
- + Pasifika Peoples (140, 1)
- - + Male (140, 2)
- - + Female (141, 2)
- + Asian (142, 1)
- - + Male (142, 2)
- - + Female (143, 2)
- + Other/Unspecified Ethnicity (144, 1)
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- - + Female (145, 2)
- + French (146, 1)
- + NZ Maori (147, 1)
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- - + Female (148, 2)
- + NZ European (149, 1)
- - + Male (149, 2)
- - + Female (150, 2)
- - + Unknown (151, 2)
- + Pasifika Peoples (152, 1)
- - + Male (152, 2)
- - + Female (153, 2)
- + Asian (154, 1)
- - + Male (154, 2)
- - + Female (155, 2)
- + Other/Unspecified Ethnicity (156, 1)
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- - + Female (157, 2)
- + Geography (158, 1)
- + NZ Maori (159, 1)
- - + Male (159, 2)
- - + Female (160, 2)
- + NZ European (161, 1)
- - + Male (161, 2)
- - + Female (162, 2)
- - + Unknown (163, 2)
- + Pasifika Peoples (164, 1)
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- - + Female (165, 2)
- + Asian (166, 1)
- - + Male (166, 2)
- - + Female (167, 2)
- + Other/Unspecified Ethnicity (168, 1)
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- - + Female (169, 2)
- + German (170, 1)
- + NZ Maori (171, 1)
- - + Male (171, 2)
- - + Female (172, 2)
- + NZ European (173, 1)
- - + Male (173, 2)
- - + Female (174, 2)
- - + Unknown (175, 2)
- + Pasifika Peoples (176, 1)
- - + Male (176, 2)
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- + Asian (178, 1)
- - + Male (178, 2)

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- + Other/Unspecified Ethnicity (180, 1)
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- - + Female (181, 2)
- + Graphics (182, 1)
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- + NZ European (185, 1)
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- - + Female (186, 2)
- - + Unknown (187, 2)
- + Pasifika Peoples (188, 1)
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- - + Female (189, 2)
- + Asian (190, 1)
- - + Male (190, 2)
- - + Female (191, 2)
- + Other/Unspecified Ethnicity (192, 1)
- - + Male (192, 2)
- - + Female (193, 2)
- + History (194, 1)
- + NZ Maori (195, 1)
- - + Male (195, 2)
- - + Female (196, 2)
- + NZ European (197, 1)
- - + Male (197, 2)
- - + Female (198, 2)
- - + Unknown (199, 2)
- + Pasifika Peoples (200, 1)
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- - + Female (201, 2)
- + Asian (202, 1)
- - + Male (202, 2)
- - + Female (203, 2)
- + Other/Unspecified Ethnicity (204, 1)
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- - + Female (205, 2)
- + Japanese (206, 1)
- + NZ Maori (207, 1)
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- + NZ European (209, 1)
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- - + Female (210, 2)
- - + Unknown (211, 2)
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- + Asian (214, 1)
- - + Male (214, 2)
- - + Female (215, 2)
- + Other/Unspecified Ethnicity (216, 1)
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- - + Female (217, 2)
- + Latin (218, 1)
- + NZ Maori (219, 1)

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- + NZ European (221, 1)
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- - + Unknown (223, 2)
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- + Asian (226, 1)
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- - + Female (227, 2)
- + Other/Unspecified Ethnicity (228, 1)
- - + Male (228, 2)
- - + Female (229, 2)
- + Mathematics with Calculus (230, 1)
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- - + Female (232, 2)
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- + Other/Unspecified Ethnicity (240, 1)
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- - + Female (241, 2)
- + Media Studies (242, 1)
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- + NZ European (245, 1)
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- - + Unknown (247, 2)
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- + Asian (250, 1)
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- - + Female (251, 2)
- + Other/Unspecified Ethnicity (252, 1)
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- - + Female (253, 2)
- + Music Studies (254, 1)
- + NZ Maori (255, 1)
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- - + Female (256, 2)
- + NZ European (257, 1)
- - + Male (257, 2)
- - + Female (258, 2)
- - + Unknown (259, 2)

- + Pasifika Peoples (260, 1)
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- - + Female (261, 2)
- + Asian (262, 1)
- - + Male (262, 2)
- - + Female (263, 2)
- + Other/Unspecified Ethnicity (264, 1)
- - + Male (264, 2)
- - + Female (265, 2)
- + Painting (266, 1)
- + NZ Maori (267, 1)
- - + Male (267, 2)
- - + Female (268, 2)
- + NZ European (269, 1)
- - + Male (269, 2)
- - + Female (270, 2)
- - + Unknown (271, 2)
- + Pasifika Peoples (272, 1)
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- - + Female (273, 2)
- + Asian (274, 1)
- - + Male (274, 2)
- - + Female (275, 2)
- + Other/Unspecified Ethnicity (276, 1)
- - + Male (276, 2)
- - + Female (277, 2)
- + Photography (278, 1)
- + NZ Maori (279, 1)
- - + Male (279, 2)
- - + Female (280, 2)
- + NZ European (281, 1)
- - + Male (281, 2)
- - + Female (282, 2)
- - + Unknown (283, 2)
- + Pasifika Peoples (284, 1)
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- - + Female (285, 2)
- + Asian (286, 1)
- - + Male (286, 2)
- - + Female (287, 2)
- + Other/Unspecified Ethnicity (288, 1)
- - + Male (288, 2)
- - + Female (289, 2)
- + Physical Education (290, 1)
- + NZ Maori (291, 1)
- - + Male (291, 2)
- - + Female (292, 2)
- + NZ European (293, 1)
- - + Male (293, 2)
- - + Female (294, 2)
- - + Unknown (295, 2)
- + Pasifika Peoples (296, 1)
- - + Male (296, 2)
- - + Female (297, 2)
- + Asian (298, 1)
- - + Male (298, 2)
- - + Female (299, 2)

- + Other/Unspecified Ethnicity (300, 1)
- - + Male (300, 2)
- - + Female (301, 2)
- + Physics (302, 1)
- + NZ Maori (303, 1)
- - + Male (303, 2)
- - + Female (304, 2)
- + NZ European (305, 1)
- - + Male (305, 2)
- - + Female (306, 2)
- - + Unknown (307, 2)
- + Pasifika Peoples (308, 1)
- - + Male (308, 2)
- - + Female (309, 2)
- + Asian (310, 1)
- - + Male (310, 2)
- - + Female (311, 2)
- + Other/Unspecified Ethnicity (312, 1)
- - + Male (312, 2)
- - + Female (313, 2)
- + Printmaking (314, 1)
- + NZ Maori (315, 1)
- - + Male (315, 2)
- - + Female (316, 2)
- + NZ European (317, 1)
- - + Male (317, 2)
- - + Female (318, 2)
- - + Unknown (319, 2)
- + Pasifika Peoples (320, 1)
- - + Male (320, 2)
- - + Female (321, 2)
- + Asian (322, 1)
- - + Male (322, 2)
- - + Female (323, 2)
- + Other/Unspecified Ethnicity (324, 1)
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- - + Female (325, 2)
- + Samoan (326, 1)
- + NZ Maori (327, 1)
- - + Male (327, 2)
- - + Female (328, 2)
- + NZ European (329, 1)
- - + Male (329, 2)
- - + Female (330, 2)
- - + Unknown (331, 2)
- + Pasifika Peoples (332, 1)
- - + Male (332, 2)
- - + Female (333, 2)
- + Asian (334, 1)
- - + Male (334, 2)
- - + Female (335, 2)
- + Other/Unspecified Ethnicity (336, 1)
- - + Male (336, 2)
- - + Female (337, 2)
- + Science (338, 1)
- + NZ Maori (339, 1)
- - + Male (339, 2)

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- + NZ European (341, 1)
- - + Male (341, 2)
- - + Female (342, 2)
- - + Unknown (343, 2)
- + Pasifika Peoples (344, 1)
- - + Male (344, 2)
- - + Female (345, 2)
- + Asian (346, 1)
- - + Male (346, 2)
- - + Female (347, 2)
- + Other/Unspecified Ethnicity (348, 1)
- - + Male (348, 2)
- - + Female (349, 2)
- + Sculpture (350, 1)
- + NZ Maori (351, 1)
- - + Male (351, 2)
- - + Female (352, 2)
- + NZ European (353, 1)
- - + Male (353, 2)
- - + Female (354, 2)
- - + Unknown (355, 2)
- + Pasifika Peoples (356, 1)
- - + Male (356, 2)
- - + Female (357, 2)
- + Asian (358, 1)
- - + Male (358, 2)
- - + Female (359, 2)
- + Other/Unspecified Ethnicity (360, 1)
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- - + Female (361, 2)
- + Spanish (362, 1)
- + NZ Maori (363, 1)
- - + Male (363, 2)
- - + Female (364, 2)
- + NZ European (365, 1)
- - + Male (365, 2)
- - + Female (366, 2)
- - + Unknown (367, 2)
- + Pasifika Peoples (368, 1)
- - + Male (368, 2)
- - + Female (369, 2)
- + Asian (370, 1)
- - + Male (370, 2)
- - + Female (371, 2)
- + Other/Unspecified Ethnicity (372, 1)
- - + Male (372, 2)
- - + Female (373, 2)
- + Statistics and Modelling (374, 1)
- + NZ Maori (375, 1)
- - + Male (375, 2)
- - + Female (376, 2)
- + NZ European (377, 1)
- - + Male (377, 2)
- - + Female (378, 2)
- - + Unknown (379, 2)
- + Pasifika Peoples (380, 1)

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- - + Female (381, 2)
- + Asian (382, 1)
- - + Male (382, 2)
- - + Female (383, 2)
- + Other/Unspecified Ethnicity (384, 1)
- - + Male (384, 2)
- - + Female (385, 2)
- + Te Reo Maori (386, 1)
- + NZ Maori (387, 1)
- - + Male (387, 2)
- - + Female (388, 2)
- + NZ European (389, 1)
- - + Male (389, 2)
- - + Female (390, 2)
- - + Unknown (391, 2)
- + Pasifika Peoples (392, 1)
- - + Male (392, 2)
- - + Female (393, 2)
- + Asian (394, 1)
- - + Male (394, 2)
- - + Female (395, 2)
- + Other/Unspecified Ethnicity (396, 1)
- - + Male (396, 2)
- - + Female (397, 2)
- + Te Reo Rangatira (398, 1)
- + NZ Maori (399, 1)
- - + Male (399, 2)
- - + Female (400, 2)
- + NZ European (401, 1)
- - + Male (401, 2)
- - + Female (402, 2)
- - + Unknown (403, 2)
- + Pasifika Peoples (404, 1)
- - + Male (404, 2)
- - + Female (405, 2)
- + Asian (406, 1)
- - + Male (406, 2)
- - + Female (407, 2)
- + Other/Unspecified Ethnicity (408, 1)
- - + Male (408, 2)
- - + Female (409, 2)
- + Technology (410, 1)
- + NZ Maori (411, 1)
- - + Male (411, 2)
- - + Female (412, 2)
- + NZ European (413, 1)
- - + Male (413, 2)
- - + Female (414, 2)
- - + Unknown (415, 2)
- + Pasifika Peoples (416, 1)
- - + Male (416, 2)
- - + Female (417, 2)
- + Asian (418, 1)
- - + Male (418, 2)
- - + Female (419, 2)
- + Other/Unspecified Ethnicity (420, 1)

- - + Male (420, 2)
 - - + Female (421, 2)

```
> rowvecs
      [,1]      [,2]      [,3]      [,4]
[1,] "All Subjects" "Accounting" "NZ Maori" "Male"
[2,] "All Subjects" "Accounting" "NZ Maori" "Female"
[3,] "All Subjects" "Accounting" "NZ European" "Male"
[4,] "All Subjects" "Accounting" "NZ European" "Female"
[5,] "All Subjects" "Accounting" "NZ European" "Unknown"
[6,] "All Subjects" "Accounting" "Pasifika Peoples" "Male"
> matColLabel
      V3      V4      V5      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      "Decile 1-3" NA      NA      NA      NA
[3,] "# of "  "# "    "# "    "# "    "# Not " "# "
[4,] "Entries" "Absent" "SNA" "Assessed" "Achieved" "Scholarship"
> cursub
      V3      V4      V5      V7      V8      V9
      NA "Decile 1-3" NA      NA      NA      NA
> currow[curcols]
      V3      V4      V5      V7      V8      V9
"Decile 1-3" NA      NA      NA      NA      NA
> cursub
      V12     V13     V14     V16     V17     V18
      NA "Decile 4-7" NA      NA      NA      NA
> currow[curcols]
      V12     V13     V14     V16     V17     V18
"Decile 4-7" NA      NA      NA      NA      NA
> cursub
      V21     V22     V23     V25     V26
      NA "Decile 8-10" NA      NA      NA
      V27
      NA
> currow[curcols]
      V21     V22     V23     V25     V26
"Decile 8-10" NA      NA      NA      NA
      V27
      NA
> cursub
      V3      V4      V5      V7      V8      V9
      "# of "  "# "    "# "    "# " "# Not " "# "
> currow[curcols]
      V3      V4      V5      V7      V8      V9
      "# of "  "# "    "# "    "# " "# Not " "# "
> cursub
      V12     V13     V14     V16     V17     V18
      "# of "  "# "    "# "    "# " "# Not " "# "
> currow[curcols]
      V12     V13     V14     V16     V17     V18
      "# of "  "# "    "# "    "# " "# Not " "# "
> cursub
      V21     V22     V23     V25     V26     V27
      "# of "  "# "    "# "    "# " "# Not " "# "
> currow[curcols]
      V21     V22     V23     V25     V26     V27
      "# of "  "# "    "# "    "# " "# Not " "# "
```

```

> cursub
      V3      V4      V5      V7      V8
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V9
"Scholarship"
> currow[curcols]
      V3      V4      V5      V7      V8
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V9
"Scholarship"
> cursub
      V12     V13     V14     V16     V17
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V18
"Scholarship"
> currow[curcols]
      V12     V13     V14     V16     V17
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V18
"Scholarship"
> cursub
      V21     V22     V23     V25     V26
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V27
"Scholarship"
> currow[curcols]
      V21     V22     V23     V25     V26
  "Entries"  "Absent"  "SNA"  "Assessed"  "Achieved"
      V27
"Scholarship"
> matCollLabel
      V3      V4      V5      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Decile 1-3" NA      NA      NA      NA      NA
[3,] "# of "   "# "   "# "   "# "   "# Not " "# "
[4,] "Entries" "Absent" "SNA" "Assessed" "Achieved" "Scholarship"
> matCollLabel
      V3      V4      V5      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Decile 1-3" NA      NA      NA      NA      NA
[3,] "# of "   "# "   "# "   "# "   "# Not " "# "
[4,] "Entries" "Absent" "SNA" "Assessed" "Achieved" "Scholarship"
> matCollLabel
      V3      V4      V5      V7      V8
[1,] NA      NA      NA      NA      NA
[2,] "Decile 1-3" NA      NA      NA      NA
[3,] "# of Entries" "# Absent" "# SNA" "# Assessed" "# Not Achieved"
      V9
[1,] NA
[2,] NA
[3,] "# Scholarship"
> res
$'Decile 1-3'
$'Decile 1-3'$rows
[1] 1 2 3 4 5 6 7

$'Decile 1-3'$cols

```

```
[1] 3
```

```
$'Decile 4-7'  
$'Decile 4-7'$rows  
[1] 8 9 10 11 12 13 14
```

```
$'Decile 4-7'$cols  
[1] 3
```

```
$'Decile 8-10'  
$'Decile 8-10'$rows  
[1] 15 16 17 18 19 20 21
```

```
$'Decile 8-10'$cols  
[1] 3
```

```
> plist  
$rows  
[1] 1 2 3 4 5 6 7
```

```
$cols  
[1] 3
```

```
> res  
# of Entries      # Absent      # SNA      # Assessed # Not Achieved  
      1          2          3          4          5  
# Scholarship  
      6
```

```
> plist  
$rows  
[1] 8 9 10 11 12 13 14
```

```
$cols  
[1] 3
```

```
> res  
# of Entries      # Absent      # SNA      # Assessed # Not Achieved  
      8          9          10          11          12  
# Scholarship  
      13
```

```
> plist  
$rows  
[1] 15 16 17 18 19 20 21
```

```
$cols  
[1] 3
```

```
> res  
# of Entries      # Absent      # SNA      # Assessed # Not Achieved  
      15          16          17          18          19  
# Scholarship  
      20
```

```
> plist  
# of Entries      # Absent      # SNA      # Assessed # Not Achieved
```

```

1
# Scholarship
6
> matData
  V3  V4  V5  V7  V8  V9
[1,] "2.0" "1.0" "0.0" "1.0" "1.0" "0.0"
[2,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[3,] "2.0" "0.0" "0.0" "2.0" "1.0" "1.0"
[4,] "3.0" "0.0" "0.0" "3.0" "2.0" "1.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "2.0" "0.0" "0.0" "2.0" "2.0" "0.0"
> datbit
  V3  V4  V5  V7  V8  V9
[1,] "2.0" "1.0" "0.0" "1.0" "1.0" "0.0"
[2,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[3,] "2.0" "0.0" "0.0" "2.0" "1.0" "1.0"
[4,] "3.0" "0.0" "0.0" "3.0" "2.0" "1.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "2.0" "0.0" "0.0" "2.0" "2.0" "0.0"
> plist
# of Entries      # Absent      # SNA      # Assessed # Not Achieved
      8          9         10         11         12
# Scholarship
13
> matData
  V3  V4  V5  V7  V8  V9
[1,] "2.0" "1.0" "0.0" "1.0" "1.0" "0.0"
[2,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[3,] "2.0" "0.0" "0.0" "2.0" "1.0" "1.0"
[4,] "3.0" "0.0" "0.0" "3.0" "2.0" "1.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "2.0" "0.0" "0.0" "2.0" "2.0" "0.0"
> datbit
  V12  V13  V14  V16  V17  V18
[1,] "2.0" "1.0" "0.0" "1.0" "1.0" "0.0"
[2,] "7.0" "2.0" "0.0" "5.0" "4.0" "1.0"
[3,] "51.0" "13.0" "0.0" "38.0" "30.0" "8.0"
[4,] "44.0" "12.0" "0.0" "32.0" "27.0" "3.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "3.0" "0.0" "0.0" "3.0" "3.0" "0.0"
> plist
# of Entries      # Absent      # SNA      # Assessed # Not Achieved
      15          16         17         18         19
# Scholarship
20
> matData
  V3  V4  V5  V7  V8  V9
[1,] "2.0" "1.0" "0.0" "1.0" "1.0" "0.0"
[2,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[3,] "2.0" "0.0" "0.0" "2.0" "1.0" "1.0"
[4,] "3.0" "0.0" "0.0" "3.0" "2.0" "1.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "2.0" "0.0" "0.0" "2.0" "2.0" "0.0"
> datbit
  V21  V22  V23  V25  V26  V27
[1,] "2.0" "2.0" "0.0" "0.0" "0.0" "0.0"
[2,] "3.0" "2.0" "0.0" "1.0" "1.0" "0.0"

```

```

[3,] "132.0" "47.0" "0.0" "85.0" "67.0" "18.0"
[4,] "71.0" "22.0" "0.0" "49.0" "35.0" "10.0"
[5,] "0.0" "0.0" "0.0" "0.0" "0.0" "0.0"
[6,] "3.0" "1.0" "0.0" "2.0" "2.0" "0.0"
> colplist
$'Decile 1-3'
+ # of Entries (1, 3)
+ # Absent (2, 3)
+ # SNA (3, 3)
+ # Assessed (4, 3)
+ # Not Achieved (5, 3)
+ # Scholarship (6, 3)
+ # Outstanding (7, 3)

$'Decile 4-7'
+ # of Entries (8, 3)
+ # Absent (9, 3)
+ # SNA (10, 3)
+ # Assessed (11, 3)
+ # Not Achieved (12, 3)
+ # Scholarship (13, 3)
+ # Outstanding (14, 3)

$'Decile 8-10'
+ # of Entries (15, 3)
+ # Absent (16, 3)
+ # SNA (17, 3)
+ # Assessed (18, 3)
+ # Not Achieved (19, 3)
+ # Scholarship (20, 3)
+ # Outstanding (21, 3)

> res
      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN UNKNOWN # of Entries
1 Decile 1-3 All Subjects Accounting      NZ Maori      Male      2
2 Decile 1-3 All Subjects Accounting      NZ Maori      Female      0
3 Decile 1-3 All Subjects Accounting      NZ European      Male      2
4 Decile 1-3 All Subjects Accounting      NZ European      Female      3
5 Decile 1-3 All Subjects Accounting      NZ European Unknown      0
6 Decile 1-3 All Subjects Accounting Pasifika Peoples      Male      2
  # Absent # SNA # Assessed # Not Achieved # Scholarship # Outstanding
1      1      0      1      1      0      0
2      0      0      0      0      0      0
3      0      0      2      1      1      0
4      0      0      3      2      1      0
5      0      0      0      0      0      0
6      0      0      2      2      0      0

```

8.4 NZQASubjects.xls

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Standard(s) and Subject(s) (broken down by Ethnicity and Gender)												
2													
3	Accounting	Externally Assessed Achievement S	National										
4	Standard L	Ethnicity	Gender		# of Results		# Not Achieved		# Achieved		# Merit		# Excellenc
5													
6	Level 1				17,692		3,859		5,683		4,978		3,172
7		NZ Maori			1,633		545		609		350		129
8			Male		847		260		327		193		67
9			Female		786		285		282		157		62
10		NZ European			9,404		1,610		3,081		2,873		1,840
11			Male		5,508		976		1,935		1,673		924
12			Female		3,896		634		1,146		1,200		916
13		Pasifika Peoples			1,490		694		494		227		75
14			Male		538		244		168		96		30
15			Female		952		450		326		131		45
16		Asian			4,749		893		1,359		1,425		1,072
17			Male		2,265		471		685		667		442
18			Female		2,484		422		674		758		630
19		Other/Unspecified Ethnicity			416		117		140		103		56
20			Male		206		53		80		50		23
21			Female		210		64		60		53		33
22													
23	Level 2				13,540		3,617		4,762		3,355		1,806
24		NZ Maori			901		390		323		138		50
25			Male		454		181		177		72		24
26			Female		447		209		146		66		26
27		NZ European			7,642		1,719		2,760		2,023		1,140
28			Male		4,247		991		1,532		1,101		623
29			Female		3,395		728		1,228		922		517
30		Pasifika Peoples			911		455		326		112		18
31			Male		328		157		126		41		4
32			Female		583		298		200		71		14
33		Asian			3,796		973		1,253		999		571
34			Male		1,834		484		633		460		257
35			Female		1,962		489		620		539		314
36		Other/Unspecified Ethnicity			290		80		100		83		27
37			Male		137		38		44		40		15
38			Female		153		42		56		43		12
39													
40	Level 3				9,373		2,802		3,183		2,277		1,111
41		NZ Maori			504		240		162		73		29
42			Male		265		117		92		36		20
43			Female		239		123		70		37		9

```

> rowData
[1] 6 55
> colData
[1] 5 13
> rowslist
$label
[1] 1 3 4

$data
[1] 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 23 24 25 26 27 28 29 30 31
[26] 32 33 34 35 36 37 38 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

> colslist
$label
[1] 1 2 3

$data
[1] 5 7 9 11 13

> res
$'Level 1'
$'Level 1'$rows
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

$'Level 1'$cols
[1] 1 2 3

```

```
$'Level 2'
$'Level 2'$rows
[1] 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
```

```
$'Level 2'$cols
[1] 1 2 3
```

```
$'Level 3'
$'Level 3'$rows
[1] 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
```

```
$'Level 3'$cols
[1] 1 2 3
```

```
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 3 4
```

```
$'NZ Maori'$cols
[1] 2 3
```

```
$'NZ European'
$'NZ European'$rows
[1] 6 7
```

```
$'NZ European'$cols
[1] 2 3
```

```
$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 9 10
```

```
$'Pasifika Peoples'$cols
[1] 2 3
```

```
$Asian
$Asian$rows
[1] 12 13
```

```
$Asian$cols
[1] 2 3
```

```
$'Other/Unspecified Ethnicity'
$'Other/Unspecified Ethnicity'$rows
[1] 15 16
```

```
$'Other/Unspecified Ethnicity'$cols
[1] 2 3
```



```

> plist
$rows
[1] 3 4

$cols
[1] 3

> res
  Male Female
    3      4
> plist
$rows
[1] 6 7

$cols
[1] 3

> res
  Male Female
    6      7
> plist
$rows
[1] 9 10

$cols
[1] 3

> res
  Male Female
    9     10
> plist
$rows
[1] 12 13

$cols
[1] 3

> res
  Male Female
   12     13
> plist
$rows
[1] 15 16

$cols
[1] 3

> res
  Male Female
   15     16
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 19 20

```

```
$'NZ Maori'$cols  
[1] 2 3
```

```
$'NZ European'  
$'NZ European'$rows  
[1] 22 23
```

```
$'NZ European'$cols  
[1] 2 3
```

```
$'Pasifika Peoples'  
$'Pasifika Peoples'$rows  
[1] 25 26
```

```
$'Pasifika Peoples'$cols  
[1] 2 3
```

```
$Asian  
$Asian$rows  
[1] 28 29
```

```
$Asian$cols  
[1] 2 3
```

```
$'Other/Unspecified Ethnicity'  
$'Other/Unspecified Ethnicity'$rows  
[1] 31 32
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2 3
```

```
> plist  
$rows  
[1] 19 20
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    19     20
```

```
> plist  
$rows  
[1] 22 23
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    22     23  
> plist
```

```

$rows
[1] 25 26

$cols
[1] 3

> res
  Male Female
    25     26
> plist
$rows
[1] 28 29

$cols
[1] 3

> res
  Male Female
    28     29
> plist
$rows
[1] 31 32

$cols
[1] 3

> res
  Male Female
    31     32
> res
$'NZ Maori'
$'NZ Maori'$rows
[1] 35 36

$'NZ Maori'$cols
[1] 2 3

$'NZ European'
$'NZ European'$rows
[1] 38 39

$'NZ European'$cols
[1] 2 3

$'Pasifika Peoples'
$'Pasifika Peoples'$rows
[1] 41 42

$'Pasifika Peoples'$cols
[1] 2 3

$Asian
$Asian$rows
[1] 44 45

```

```
$Asian$cols  
[1] 2 3
```

```
$'Other/Unspecified Ethnicity'  
$'Other/Unspecified Ethnicity'$rows  
[1] 47 48
```

```
$'Other/Unspecified Ethnicity'$cols  
[1] 2 3
```

```
> plist  
$rows  
[1] 35 36
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    35     36  
> plist  
$rows  
[1] 38 39
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    38     39  
> plist  
$rows  
[1] 41 42
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    41     42  
> plist  
$rows  
[1] 44 45
```

```
$cols  
[1] 3
```

```
> res  
  Male Female  
    44     45  
> plist  
$rows  
[1] 47 48
```

```

$cols
[1] 3

> res
  Male Female
    47      48
> rowplist
$'Level 1'
+ NZ Maori (2, 2)
- + Male (3, 3)
- + Female (4, 3)
+ NZ European (5, 2)
- + Male (6, 3)
- + Female (7, 3)
+ Pasifika Peoples (8, 2)
- + Male (9, 3)
- + Female (10, 3)
+ Asian (11, 2)
- + Male (12, 3)
- + Female (13, 3)
+ Other/Unspecified Ethnicity (14, 2)
- + Male (15, 3)
- + Female (16, 3)

$'Level 2'
+ NZ Maori (18, 2)
- + Male (19, 3)
- + Female (20, 3)
+ NZ European (21, 2)
- + Male (22, 3)
- + Female (23, 3)
+ Pasifika Peoples (24, 2)
- + Male (25, 3)
- + Female (26, 3)
+ Asian (27, 2)
- + Male (28, 3)
- + Female (29, 3)
+ Other/Unspecified Ethnicity (30, 2)
- + Male (31, 3)
- + Female (32, 3)

$'Level 3'
+ NZ Maori (34, 2)
- + Male (35, 3)
- + Female (36, 3)
+ NZ European (37, 2)
- + Male (38, 3)
- + Female (39, 3)
+ Pasifika Peoples (40, 2)
- + Male (41, 3)
- + Female (42, 3)
+ Asian (43, 2)
- + Male (44, 3)
- + Female (45, 3)
+ Other/Unspecified Ethnicity (46, 2)
- + Male (47, 3)
- + Female (48, 3)

```

```

> rowvecs
      [,1]      [,2]      [,3]
[1,] "Level 1" "NZ Maori" "Male"
[2,] "Level 1" "NZ Maori" "Female"
[3,] "Level 1" "NZ European" "Male"
[4,] "Level 1" "NZ European" "Female"
[5,] "Level 1" "Pasifika Peoples" "Male"
[6,] "Level 1" "Pasifika Peoples" "Female"
> matColLabel
      V5      V7      V9      V11      V13
[1,] NA      NA      NA      NA      NA
[2,] "National" NA      NA      NA      NA
[3,] "# of Results" "# Not Achieved" "# Achieved" "# Merit" "# Excellence"
> cursub
      V5      V7      V9      V11      V13
"National" NA      NA      NA      NA
> currow[curcols]
      V5      V7      V9      V11      V13
"National" NA      NA      NA      NA
> cursub
      V5      V7      V9      V11
"# of Results" "# Not Achieved" "# Achieved" "# Merit"
      V13
"# Excellence"
> currow[curcols]
      V5      V7      V9      V11
"# of Results" "# Not Achieved" "# Achieved" "# Merit"
      V13
"# Excellence"
> matColLabel
      V5      V7      V9      V11      V13
[1,] NA      NA      NA      NA      NA
[2,] "National" NA      NA      NA      NA
[3,] "# of Results" "# Not Achieved" "# Achieved" "# Merit" "# Excellence"
> matColLabel
      V5      V7      V9      V11      V13
[1,] NA      NA      NA      NA      NA
[2,] "National" NA      NA      NA      NA
[3,] "# of Results" "# Not Achieved" "# Achieved" "# Merit" "# Excellence"
> matColLabel
      V5      V7      V9      V11      V13
[1,] NA      NA      NA      NA      NA
[2,] "National" NA      NA      NA      NA
[3,] "# of Results" "# Not Achieved" "# Achieved" "# Merit" "# Excellence"
> res
$National
$National$rows
[1] 1 2 3 4 5

$National$cols
[1] 3

> plist
$rows
[1] 1 2 3 4 5

```

```

$cols
[1] 3

> res
# of Results # Not Achieved # Achieved # Merit # Excellence
      1          2          3          4          5

> plist
# of Results # Not Achieved # Achieved # Merit # Excellence
      1          2          3          4          5

> matData
      V5      V7      V9      V11      V13
[1,] "847.0" "260.0" "327.0" "193.0" "67.0"
[2,] "786.0" "285.0" "282.0" "157.0" "62.0"
[3,] "5508.0" "976.0" "1935.0" "1673.0" "924.0"
[4,] "3896.0" "634.0" "1146.0" "1200.0" "916.0"
[5,] "538.0" "244.0" "168.0" "96.0" "30.0"
[6,] "952.0" "450.0" "326.0" "131.0" "45.0"

> datbit
      V5      V7      V9      V11      V13
[1,] "847.0" "260.0" "327.0" "193.0" "67.0"
[2,] "786.0" "285.0" "282.0" "157.0" "62.0"
[3,] "5508.0" "976.0" "1935.0" "1673.0" "924.0"
[4,] "3896.0" "634.0" "1146.0" "1200.0" "916.0"
[5,] "538.0" "244.0" "168.0" "96.0" "30.0"
[6,] "952.0" "450.0" "326.0" "131.0" "45.0"

> colplist
$National
+ # of Results (1, 3)
+ # Not Achieved (2, 3)
+ # Achieved (3, 3)
+ # Merit (4, 3)
+ # Excellence (5, 3)

> res
      UNKNOWN UNKNOWN      UNKNOWN UNKNOWN # of Results # Not Achieved
1 National Level 1      NZ Maori   Male      847          260
2 National Level 1      NZ Maori   Female    786          285
3 National Level 1      NZ European Male    5508          976
4 National Level 1      NZ European Female   3896          634
5 National Level 1 Pasifika Peoples Male    538          244
6 National Level 1 Pasifika Peoples Female   952          450
      # Achieved # Merit # Excellence
1          327    193          67
2          282    157          62
3          1935   1673          924
4          1146   1200          916
5           168     96           30
6           326    131           45

```

8.5 StatsNZGDP.csv

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Series, GDP(P), Nominal, Actual, Sector of ownership (Annual–Mar)												
2	Gross Domestic Product – product measure												
3	Market					Non–Market				Total Market and Non–Market			
4		Private	Central Gov	Local Gove	All Sectors	Private	Central Gov	Local Gove	All Sectors	Private	Central Gov	Local Gove	All Sectors
5	1,972	5,200	568	155	5,923	58	660	100	818	5,258	1,227	255	6,740
6	1,973	5,993	649	169	6,811	68	738	118	924	6,062	1,387	287	7,735
7	1,974	7,013	723	183	7,919	78	880	136	1,093	7,091	1,604	318	9,013
8	1,975	7,636	750	202	8,588	90	1,049	164	1,303	7,727	1,798	366	9,891
9	1,976	8,526	840	231	9,597	108	1,264	202	1,574	8,634	2,104	433	11,171
10	1,977	10,450	1,179	295	11,924	130	1,431	213	1,774	10,580	2,611	508	13,698
11	1,978	11,469	1,398	362	13,230	150	1,713	247	2,111	11,620	3,111	610	15,341
12	1,979	12,729	1,685	394	14,808	180	2,105	306	2,591	12,909	3,789	700	17,398
13	1,980	14,707	2,050	501	17,258	216	2,434	368	3,018	14,923	4,484	869	20,275
14	1,981	16,947	2,358	559	19,864	261	3,042	439	3,742	17,207	5,401	998	23,606
15	1,982	20,751	2,770	655	24,175	316	3,619	542	4,477	21,067	6,388	1,197	28,652
16	1,983	23,525	3,184	759	27,468	332	3,975	606	4,913	23,858	7,158	1,365	32,381
17	1,984	26,577	3,644	800	31,021	327	4,081	653	5,061	26,903	7,725	1,453	36,081
18	1,985	30,530	3,924	850	35,304	361	4,270	720	5,351	30,891	8,194	1,570	40,655
19	1,986	35,104	4,741	1,008	40,853	418	5,012	815	6,245	35,522	9,752	1,823	47,098
20	1,987	40,167	6,189	1,160	47,515	501	6,235	896	7,631	40,667	12,423	2,055	55,146
21	1,988	43,613	6,957	1,192	51,762	582	6,885	961	8,427	44,195	13,842	2,153	60,190
22	1,989	47,816	7,052	1,364	56,231	663	7,410	1,076	9,149	48,479	14,461	2,440	65,380
23	1,990	51,170	6,267	1,364	58,800	722	7,710	1,153	9,585	51,892	13,977	2,517	68,385
24	1,991	53,613	4,970	1,412	59,995	801	7,912	1,228	9,941	54,415	12,882	2,640	69,936
25	1,992	54,492	3,917	1,366	59,775	895	7,960	1,189	10,045	55,387	11,877	2,556	69,819
26	1,993	56,696	3,626	1,431	61,754	961	8,115	1,138	10,214	57,657	11,741	2,570	71,968
27	1,994	62,428	3,360	1,452	67,240	1,024	8,277	1,176	10,477	63,452	11,637	2,628	77,717
28	1,995	67,495	3,210	1,617	72,322	1,117	8,366	1,204	10,687	68,612	11,576	2,822	83,009
29	1,996	72,237	3,090	1,745	77,072	1,221	8,710	1,249	11,180	73,458	11,800	2,994	88,252
30	1,997	75,844	3,058	1,849	80,750	1,419	9,138	1,249	11,806	77,262	12,196	3,098	92,557
31	1,998	78,712	3,129	1,890	83,732	1,633	9,489	1,277	12,399	80,345	12,618	3,167	96,130
32	1,999	80,382	2,803	1,809	84,994	1,958	9,945	1,298	13,201	82,340	12,748	3,107	98,195
33	2,000	86,163	2,568	1,716	90,447	2,076	10,303	1,322	13,701	88,239	12,872	3,037	104,148
34	2,001	91,811	2,396	1,692	95,898	2,206	10,705	1,364	14,275	94,016	13,101	3,056	110,173
35	2,002	98,851	2,870	1,837	103,558	2,312	11,230	1,441	14,984	101,163	14,101	3,278	118,542
36	2,003	102,691	3,691	2,016	108,398	2,455	11,929	1,532	15,916	105,146	15,619	3,548	124,314
37	2,004	109,298	4,138	2,331	115,767	2,683	12,753	1,645	17,081	111,981	16,891	3,976	132,848
38	2,005	116,966	4,295	2,268	123,528	2,937	13,812	1,769	18,518	119,902	18,107	4,037	142,046
39	2,006	122,292	4,859	2,685	129,835	3,013	15,058	1,899	19,971	125,305	19,917	4,584	149,806
40	2,007	127,531	4,857	2,735	135,123	3,131	16,257	2,105	21,493	130,662	21,114	4,840	156,616
41	2,008	138,127	5,554	2,962	146,644	3,317	17,569	2,298	23,184	141,444	23,124	5,260	169,828
42	2,009	137,240	5,783	3,195	146,219	3,742	19,067	2,470	25,279	140,982	24,850	5,666	171,498
43	2,010	139,525	6,090	3,252	148,866	3,942	20,007	2,605	26,553	143,466	26,097	5,856	175,419

```

> rowData
[1] 5 43
> colData
[1] 1 37
> rowslist
$label
[1] 1 2 3 4

$data
[1] 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
[26] 30 31 32 33 34 35 36 37 38 39 40 41 42 43

> colslist
$label
integer(0)

$data
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[26] 26 27 28 29 30 31 32 33 34 35 36 37

> plist
$rows
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39

$cols

```



```

[1] 1

> res
1972 1973 1974 1975 1976 1977
  1    2    3    4    5    6
> rowplist
1972 1973 1974 1975 1976 1977
  1    2    3    4    5    6
> rowvecs
[,1]
[1,] "1972"
[2,] "1973"
[3,] "1974"
[4,] "1975"
[5,] "1976"
[6,] "1977"
> matColLabel
      V2                                     V3
[1,] NA                                     NA
[2,] "Gross Domestic Product - product measure" NA
[3,] "Market"                               NA
[4,] "Private"                             "Central Government Sector"
      V4          V5          V6
[1,] NA          NA          NA
[2,] NA          NA          NA
[3,] NA          NA          "Non-Market"
[4,] "Local Government Sector" "All Sectors" "Private"
      V7
[1,] NA
[2,] NA
[3,] NA
[4,] "Central Government Sector"
> cursub
      V2
"Gross Domestic Product - product measure"
      V3
      NA
      V4
      NA
      V5
      NA
      V6
      NA
      V7
      NA
> currow[curcols]
      V2
"Gross Domestic Product - product measure"
      V3
      NA
      V4
      NA
      V5
      NA
      V6
      NA
      V7

```

```

NA
> cursub
      V14      V15      V16      V17      V18      V19
"Output"      NA      NA      NA      NA      NA
> currow[curcols]
      V14      V15      V16      V17      V18      V19
"Output"      NA      NA      NA      NA      NA
> cursub
      V26      V27
"Intermediate Consumption"      NA
      V28      V29
      NA      NA
      V30      V31
      NA      NA
> currow[curcols]
      V26      V27
"Intermediate Consumption"      NA
      V28      V29
      NA      NA
      V30      V31
      NA      NA
> cursub
      V2      V3      V4      V5
"Market"      NA      NA      NA
> currow[curcols]
      V2      V3      V4      V5
"Market"      NA      NA      NA
> cursub
      V6      V7      V8      V9
"Non-Market"      NA      NA      NA
> currow[curcols]
      V6      V7      V8      V9
"Non-Market"      NA      NA      NA
> cursub
      V10      V11
"Total Market and Non-Market"      NA
      V12      V13
      NA      NA
> currow[curcols]
      V10      V11
"Total Market and Non-Market"      NA
      V12      V13
      NA      NA
> cursub
      V14      V15      V16      V17
"Market"      NA      NA      NA
> currow[curcols]
      V14      V15      V16      V17
"Market"      NA      NA      NA
> cursub
      V18      V19      V20      V21
"Non-Market"      NA      NA      NA
> currow[curcols]
      V18      V19      V20      V21
"Non-Market"      NA      NA      NA
> cursub
      V22      V23

```

```

"Total Market and Non-Market"      NA
      V24      V25
      NA      NA
> currow[curcols]
      V22      V23
"Total Market and Non-Market"      NA
      V24      V25
      NA      NA
> cursub
      V26      V27      V28      V29
"Market"      NA      NA      NA
> currow[curcols]
      V26      V27      V28      V29
"Market"      NA      NA      NA
> cursub
      V30      V31      V32      V33
"Non-Market"      NA      NA      NA
> currow[curcols]
      V30      V31      V32      V33
"Non-Market"      NA      NA      NA
> cursub
      V34      V35
"Total Market and Non-Market"      NA
      V36      V37
      NA      NA
> currow[curcols]
      V34      V35
"Total Market and Non-Market"      NA
      V36      V37
      NA      NA
> cursub
      V2      V3
      "Private" "Central Government Sector"
      V4      V5
      "Local Government Sector"      "All Sectors"
> currow[curcols]
      V2      V3
      "Private" "Central Government Sector"
      V4      V5
      "Local Government Sector"      "All Sectors"
> cursub
      V6      V7
      "Private" "Central Government Sector"
      V8      V9
      "Local Government Sector"      "All Sectors"
> currow[curcols]
      V6      V7
      "Private" "Central Government Sector"
      V8      V9
      "Local Government Sector"      "All Sectors"
> cursub
      V10      V11
      "Private" "Central Government Sector"
      V12      V13
      "Local Government Sector"      "All Sectors"
> currow[curcols]
      V10      V11

```

```

        "Private" "Central Government Sector"
            V12 V13
"Local Government Sector" "All Sectors"
> cursub
            V14 V15
        "Private" "Central Government Sector"
            V16 V17
"Local Government Sector" "All Sectors"
> currow[curcols]
            V14 V15
        "Private" "Central Government Sector"
            V16 V17
"Local Government Sector" "All Sectors"
> cursub
            V18 V19
        "Private" "Central Government Sector"
            V20 V21
"Local Government Sector" "All Sectors"
> currow[curcols]
            V18 V19
        "Private" "Central Government Sector"
            V20 V21
"Local Government Sector" "All Sectors"
> cursub
            V22 V23
        "Private" "Central Government Sector"
            V24 V25
"Local Government Sector" "All Sectors"
> currow[curcols]
            V22 V23
        "Private" "Central Government Sector"
            V24 V25
"Local Government Sector" "All Sectors"
> cursub
            V26 V27
        "Private" "Central Government Sector"
            V28 V29
"Local Government Sector" "All Sectors"
> currow[curcols]
            V26 V27
        "Private" "Central Government Sector"
            V28 V29
"Local Government Sector" "All Sectors"
> cursub
            V30 V31
        "Private" "Central Government Sector"
            V32 V33
"Local Government Sector" "All Sectors"
> currow[curcols]
            V30 V31
        "Private" "Central Government Sector"
            V32 V33
"Local Government Sector" "All Sectors"
> cursub
            V34 V35
        "Private" "Central Government Sector"
            V36 V37

```

```

"Local Government Sector"          "All Sectors"
> currow[curcols]
      V34      V35
      "Private" "Central Government Sector"
      V36      V37
"Local Government Sector"          "All Sectors"
> matColLabel
      V2      V3
[1,] NA      NA
[2,] "Gross Domestic Product - product measure" NA
[3,] "Market"      NA
[4,] "Private"      "Central Government Sector"
      V4      V5      V6
[1,] NA      NA      NA
[2,] NA      NA      NA
[3,] NA      NA      "Non-Market"
[4,] "Local Government Sector" "All Sectors" "Private"
      V7
[1,] NA
[2,] NA
[3,] NA
[4,] "Central Government Sector"
> matColLabel
      V2      V3
[1,] NA      NA
[2,] "Gross Domestic Product - product measure" NA
[3,] "Market"      NA
[4,] "Private"      "Central Government Sector"
      V4      V5      V6
[1,] NA      NA      NA
[2,] NA      NA      NA
[3,] NA      NA      "Non-Market"
[4,] "Local Government Sector" "All Sectors" "Private"
      V7
[1,] NA
[2,] NA
[3,] NA
[4,] "Central Government Sector"
> matColLabel
      V2      V3
[1,] NA      NA
[2,] "Gross Domestic Product - product measure" NA
[3,] "Market"      NA
[4,] "Private"      "Central Government Sector"
      V4      V5      V6
[1,] NA      NA      NA
[2,] NA      NA      NA
[3,] NA      NA      "Non-Market"
[4,] "Local Government Sector" "All Sectors" "Private"
      V7
[1,] NA
[2,] NA
[3,] NA
[4,] "Central Government Sector"
> res
$'Gross Domestic Product - product measure'
$'Gross Domestic Product - product measure'$rows

```

```

[1] 1 2 3 4 5 6 7 8 9 10 11 12

$'Gross Domestic Product - product measure'$cols
[1] 3 4

$Output
$Output$rows
[1] 13 14 15 16 17 18 19 20 21 22 23 24

$Output$cols
[1] 3 4

$'Intermediate Consumption'
$'Intermediate Consumption'$rows
[1] 25 26 27 28 29 30 31 32 33 34 35 36

$'Intermediate Consumption'$cols
[1] 3 4

> res
$Market
$Market$rows
[1] 1 2 3 4

$Market$cols
[1] 4

$'Non-Market'
$'Non-Market'$rows
[1] 5 6 7 8

$'Non-Market'$cols
[1] 4

$'Total Market and Non-Market'
$'Total Market and Non-Market'$rows
[1] 9 10 11 12

$'Total Market and Non-Market'$cols
[1] 4

> plist
$rows
[1] 1 2 3 4

$cols
[1] 4

> res

```

Private	Central Government Sector	Local Government Sector
1	2	3

```

All Sectors
4

> plist
$rows
[1] 5 6 7 8

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      5                                6                                7
All Sectors
8

> plist
$rows
[1] 9 10 11 12

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      9                                10                                11
All Sectors
12

> res
$Market
$Market$rows
[1] 13 14 15 16

$Market$cols
[1] 4

$'Non-Market'
$'Non-Market'$rows
[1] 17 18 19 20

$'Non-Market'$cols
[1] 4

$'Total Market and Non-Market'
$'Total Market and Non-Market'$rows
[1] 21 22 23 24

$'Total Market and Non-Market'$cols
[1] 4

> plist
$rows
[1] 13 14 15 16

$cols
[1] 4

```

```

> res
      Private Central Government Sector  Local Government Sector
      13                               14                               15
    All Sectors
      16

> plist
$rows
[1] 17 18 19 20

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      17                               18                               19
    All Sectors
      20

> plist
$rows
[1] 21 22 23 24

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      21                               22                               23
    All Sectors
      24

> res
$Market
$Market$rows
[1] 25 26 27 28

$Market$cols
[1] 4

$'Non-Market'
$'Non-Market'$rows
[1] 29 30 31 32

$'Non-Market'$cols
[1] 4

$'Total Market and Non-Market'
$'Total Market and Non-Market'$rows
[1] 33 34 35 36

$'Total Market and Non-Market'$cols
[1] 4

> plist
$rows

```



```

[1] 25 26 27 28

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      25                               26                               27
All Sectors
      28

> plist
$rows
[1] 29 30 31 32

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      29                               30                               31
All Sectors
      32

> plist
$rows
[1] 33 34 35 36

$cols
[1] 4

> res
      Private Central Government Sector  Local Government Sector
      33                               34                               35
All Sectors
      36

> plist
      Private Central Government Sector  Local Government Sector
      1                               2                               3
All Sectors
      4

> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58"  "660"
[2,] "5993" "649" "169" "6811" "68"  "738"
[3,] "7013" "723" "183" "7919" "78"  "880"
[4,] "7636" "750" "202" "8588" "90"  "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V2      V3      V4      V5
[1,] "5200" "568" "155" "5923"
[2,] "5993" "649" "169" "6811"
[3,] "7013" "723" "183" "7919"
[4,] "7636" "750" "202" "8588"
[5,] "8526" "840" "231" "9597"
[6,] "10450" "1179" "295" "11924"
> plist
      Private Central Government Sector  Local Government Sector

```

```

5
All Sectors
8
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V6      V7      V8      V9
[1,] "58" "660" "100" "818"
[2,] "68" "738" "118" "924"
[3,] "78" "880" "136" "1093"
[4,] "90" "1049" "164" "1303"
[5,] "108" "1264" "202" "1574"
[6,] "130" "1431" "213" "1774"
> plist
      Private Central Government Sector Local Government Sector
      9 10 11
All Sectors
12
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V10      V11      V12      V13
[1,] "5258" "1227" "255" "6740"
[2,] "6062" "1387" "287" "7735"
[3,] "7091" "1604" "318" "9013"
[4,] "7727" "1798" "366" "9891"
[5,] "8634" "2104" "433" "11171"
[6,] "10580" "2611" "508" "13698"
> plist
      Private Central Government Sector Local Government Sector
      13 14 15
All Sectors
16
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V14      V15      V16      V17
[1,] "10994" "1005" "357" "12355"
[2,] "13021" "1111" "391" "14523"

```

```

[3,] "15370" "1232" "429" "17031"
[4,] "17264" "1453" "492" "19210"
[5,] "20239" "1784" "574" "22597"
[6,] "25121" "2239" "733" "28092"
> plist
              Private Central Government Sector   Local Government Sector
              17                               18                               19
              All Sectors
              20
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V18  V19  V20  V21
[1,] "113" "884" "179" "1176"
[2,] "129" "987" "223" "1339"
[3,] "145" "1147" "262" "1554"
[4,] "170" "1384" "328" "1882"
[5,] "196" "1673" "392" "2261"
[6,] "245" "1918" "415" "2578"
> plist
              Private Central Government Sector   Local Government Sector
              21                               22                               23
              All Sectors
              24
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V22  V23  V24  V25
[1,] "11107" "1889" "535" "13531"
[2,] "13149" "2098" "614" "15862"
[3,] "15515" "2379" "691" "18586"
[4,] "17434" "2837" "820" "21092"
[5,] "20435" "3457" "966" "24859"
[6,] "25366" "4157" "1147" "30670"
> plist
              Private Central Government Sector   Local Government Sector
              25                               26                               27
              All Sectors
              28
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"

```

```

[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V26      V27      V28      V29
[1,] "5793" "437" "202" "6432"
[2,] "7027" "463" "222" "7712"
[3,] "8357" "508" "247" "9112"
[4,] "9628" "704" "290" "10622"
[5,] "11713" "944" "343" "13000"
[6,] "14671" "1060" "437" "16168"
> plist
              Private Central Government Sector   Local Government Sector
              29                               30                               31
      All Sectors
              32
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V30      V31      V32      V33
[1,] "56" "224" "78" "359"
[2,] "60" "249" "106" "415"
[3,] "67" "267" "127" "461"
[4,] "80" "335" "164" "579"
[5,] "88" "409" "190" "687"
[6,] "116" "487" "202" "804"
> plist
              Private Central Government Sector   Local Government Sector
              33                               34                               35
      All Sectors
              36
> matData
      V2      V3      V4      V5      V6      V7
[1,] "5200" "568" "155" "5923" "58" "660"
[2,] "5993" "649" "169" "6811" "68" "738"
[3,] "7013" "723" "183" "7919" "78" "880"
[4,] "7636" "750" "202" "8588" "90" "1049"
[5,] "8526" "840" "231" "9597" "108" "1264"
[6,] "10450" "1179" "295" "11924" "130" "1431"
> datbit
      V34      V35      V36      V37
[1,] "5849" "662" "280" "6791"
[2,] "7088" "712" "327" "8126"
[3,] "8424" "775" "373" "9573"
[4,] "9708" "1039" "454" "11201"
[5,] "11801" "1353" "533" "13687"
[6,] "14786" "1547" "639" "16972"
> colplist
$'Gross Domestic Product - product measure'
+ Market (1, 3)
- + Private (1, 4)
- + Central Government Sector (2, 4)

```

- + Local Government Sector (3, 4)
- + All Sectors (4, 4)
- + Non-Market (5, 3)
- + Private (5, 4)
- + Central Government Sector (6, 4)
- + Local Government Sector (7, 4)
- + All Sectors (8, 4)
- + Total Market and Non-Market (9, 3)
- + Private (9, 4)
- + Central Government Sector (10, 4)
- + Local Government Sector (11, 4)
- + All Sectors (12, 4)

\$Output

- + Market (13, 3)
- + Private (13, 4)
- + Central Government Sector (14, 4)
- + Local Government Sector (15, 4)
- + All Sectors (16, 4)
- + Non-Market (17, 3)
- + Private (17, 4)
- + Central Government Sector (18, 4)
- + Local Government Sector (19, 4)
- + All Sectors (20, 4)
- + Total Market and Non-Market (21, 3)
- + Private (21, 4)
- + Central Government Sector (22, 4)
- + Local Government Sector (23, 4)
- + All Sectors (24, 4)

\$'Intermediate Consumption'

- + Market (25, 3)
- + Private (25, 4)
- + Central Government Sector (26, 4)
- + Local Government Sector (27, 4)
- + All Sectors (28, 4)
- + Non-Market (29, 3)
- + Private (29, 4)
- + Central Government Sector (30, 4)
- + Local Government Sector (31, 4)
- + All Sectors (32, 4)
- + Total Market and Non-Market (33, 3)
- + Private (33, 4)
- + Central Government Sector (34, 4)
- + Local Government Sector (35, 4)
- + All Sectors (36, 4)

> res

		UNKNOWN	UNKNOWN	UNKNOWN	Private
1	Gross Domestic Product - product measure	Market	1972	5200	
2	Gross Domestic Product - product measure	Market	1973	5993	
3	Gross Domestic Product - product measure	Market	1974	7013	
4	Gross Domestic Product - product measure	Market	1975	7636	
5	Gross Domestic Product - product measure	Market	1976	8526	
6	Gross Domestic Product - product measure	Market	1977	10450	
	Central Government Sector	Local Government Sector	All Sectors		
1		568	155	5923	

2	649	169	6811
3	723	183	7919
4	750	202	8588
5	840	231	9597
6	1179	295	11924

8.6 StatsNZLabourForce.csv

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Labour Force Status by Sex by Sing/Comb Ethnic Group (Qrtly-Mar/Jun/Sep/Dec)												
2		Male											
3		European Only								Maori Only			
4		Persons En	Persons Un	Not in Labo	Working Ag	Labour Forc	Unemploy	Employer	Total Labou	Persons En	Persons Un	Not in Labo	Working Ag
5	2007Q4	856	20	280	1,156	76	2	74	876	71	6	28	105
6	2008Q1	863	25	284	1,172	76	3	74	888	69	8	31	108
7	2008Q2	850	26	281	1,157	76	3	74	876	67	6	27	100
8	2008Q3	840	30	286	1,155	75	3	73	869	72	9	31	111
9	2008Q4	855	30	275	1,159	76	3	74	884	76	8	28	113
10	2009Q1	845	35	279	1,160	76	4	73	880	75	8	36	120
11	2009Q2	832	35	280	1,146	76	4	73	866	74	10	33	117
12	2009Q3	813	42	290	1,146	75	5	71	856	71	11	36	118
13	2009Q4	831	40	277	1,148	76	5	72	871	72	14	33	118
14	2010Q1	822	36	283	1,142	75	4	72	859	72	11	35	118
15	2010Q2	825	40	290	1,155	75	5	71	865	72	14	34	119
16	2010Q3	837	31	287	1,155	75	4	72	868	70	14	34	117
17	2010Q4	838	40	277	1,155	76	4	73	878	71	14	36	122
18	2011Q1	830	37	281	1,148	76	4	72	866	71	14	35	120
19	2011Q2	839	41	279	1,159	76	5	72	880	67	10	37	115
20	2011Q3	830	35	280	1,145	76	4	72	865	70	13	35	118
21	2011Q4	842	35	278	1,154	76	4	73	877	69	13	36	118
22	2012Q1	843	43	283	1,169	76	5	72	886	72	11	35	117
23	2012Q2	837	38	296	1,172	75	4	71	875	66	11	33	110
24	2012Q3	833	38	298	1,169	74	4	71	871	67	13	33	113
25	2012Q4	833	41	298	1,173	75	5	71	874	63	12	35	111
26	2013Q1	832	36	295	1,162	75	4	72	868	70	12	38	120
27	Table information:												
28	Units:												
29	Persons Employed in Labour Force: Number, Magnitude = Thousands												
30	Persons Unemployed in Labour Force: Number, Magnitude = Thousands												
31	Not in Labour Force: Number, Magnitude = Thousands												
32	Working Age Population: Number, Magnitude = Thousands												
33	Labour Force Participation Rate: Percent, Magnitude = Units												
34	Unemployment Rate: Percent, Magnitude = Units												
35	Employment Rate: Percent, Magnitude = Units												
36	Total Labour Force: Number, Magnitude = Thousands												
37	Footnotes:												
38													
39	Symbols:												
40	.. figure not available												
41	C: Confidential												
42	E: Early Estimate												
43	P: Provisional												

```
> rowData
```

```
[1] 5 26
```

```
> colData
```

```
[1] 2 241
```

```
> rowslist
```

```
$label
```

```
[1] 1 2 3 4
```

```
$data
```

```
[1] 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
```

```
> colslist
```

```
$label
```

```
[1] 1
```

```
$data
```

```
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
[19] 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
[37] 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
[55] 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73
[73] 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91
[91] 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109
[109] 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
[127] 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145
[145] 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163
[163] 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181
```

```

[181] 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199
[199] 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217
[217] 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235
[235] 236 237 238 239 240 241

```

```
> plist
```

```
$rows
```

```
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
```

```
$cols
```

```
[1] 1
```

```
> res
```

```
2007Q4 2008Q1 2008Q2 2008Q3 2008Q4 2009Q1
      1      2      3      4      5      6
```

```
> rowplist
```

```
2007Q4 2008Q1 2008Q2 2008Q3 2008Q4 2009Q1
      1      2      3      4      5      6
```

```
> rowvecs
```

```
[,1]
```

```
[1,] "2007Q4"
```

```
[2,] "2008Q1"
```

```
[3,] "2008Q2"
```

```
[4,] "2008Q3"
```

```
[5,] "2008Q4"
```

```
[6,] "2009Q1"
```

```
> matColLabel
```

```
      V2                                V3
```

```
[1,] NA                                NA
```

```
[2,] "Male"                            NA
```

```
[3,] "European Only"                   NA
```

```
[4,] "Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
```

```
      V4                                V5
```

```
[1,] NA                                NA
```

```
[2,] NA                                NA
```

```
[3,] NA                                NA
```

```
[4,] "Not in Labour Force" "Working Age Population"
```

```
      V6                                V7
```

```
[1,] NA                                NA
```

```
[2,] NA                                NA
```

```
[3,] NA                                NA
```

```
[4,] "Labour Force Participation Rate" "Unemployment Rate"
```

```
> cursub
```

```
      V2      V3      V4      V5      V6      V7
```

```
"Male"    NA      NA      NA      NA      NA      NA
```

```
> currow[curcols]
```

```
      V2      V3      V4      V5      V6      V7
```

```
"Male"    NA      NA      NA      NA      NA      NA
```

```
> cursub
```

```
      V82      V83      V84      V85      V86      V87
```

```
"Female"    NA      NA      NA      NA      NA      NA
```

```
> currow[curcols]
```

```
      V82      V83      V84      V85      V86      V87
```

```
"Female"    NA      NA      NA      NA      NA      NA
```

```
> cursub
```

```
      V162                                V163                                V164                                V165
```

```
"Total Both Sexes"                        NA                                NA                                NA
```



```

                V166                V167
                NA                NA
> currow[curcols]
                V162                V163                V164                V165
"Total Both Sexes"                NA                NA                NA
                V166                V167
                NA                NA
> cursub
                V2                V3                V4                V5                V6
"European Only"                NA                NA                NA                NA
                V7
                NA
> currow[curcols]
                V2                V3                V4                V5                V6
"European Only"                NA                NA                NA                NA
                V7
                NA
> cursub
                V10                V11                V12                V13                V14                V15
"Maori Only"                NA                NA                NA                NA                NA
> currow[curcols]
                V10                V11                V12                V13                V14                V15
"Maori Only"                NA                NA                NA                NA                NA
> cursub
                V18                V19                V20
"Pacific Peoples Only"                NA                NA
                V21                V22                V23
                NA                NA                NA
> currow[curcols]
                V18                V19                V20
"Pacific Peoples Only"                NA                NA
                V21                V22                V23
                NA                NA                NA
> cursub
                V26                V27                V28                V29                V30                V31
"Asian Only"                NA                NA                NA                NA                NA
> currow[curcols]
                V26                V27                V28                V29                V30                V31
"Asian Only"                NA                NA                NA                NA                NA
> cursub
                V34                V35                V36                V37                V38                V39
"MELAA Only"                NA                NA                NA                NA                NA
> currow[curcols]
                V34                V35                V36                V37                V38                V39
"MELAA Only"                NA                NA                NA                NA                NA
> cursub
                V42                V43                V44
"Other Ethnicity Only"                NA                NA
                V45                V46                V47
                NA                NA                NA
> currow[curcols]
                V42                V43                V44
"Other Ethnicity Only"                NA                NA
                V45                V46                V47
                NA                NA                NA
> cursub
                V50                V51                V52                V53

```

"European/Maori"	NA	NA	NA
V54	V55		
NA	NA		
> currow[urcols]			
V50	V51	V52	V53
"European/Maori"	NA	NA	NA
V54	V55		
NA	NA		
> cursub			
	V58		
"Two or More Groups Not Elsewhere Included"			
	V59		
	NA		
	V60		
	NA		
	V61		
	NA		
	V62		
	NA		
	V63		
	NA		
> currow[urcols]			
	V58		
"Two or More Groups Not Elsewhere Included"			
	V59		
	NA		
	V60		
	NA		
	V61		
	NA		
	V62		
	NA		
	V63		
	NA		
> cursub			
	V66	V67	V68
"Residual Categories"	NA	NA	NA
V69	V70	V71	
NA	NA	NA	
> currow[urcols]			
	V66	V67	V68
"Residual Categories"	NA	NA	NA
V69	V70	V71	
NA	NA	NA	
> cursub			
	V74	V75	V76
"Total All Ethnic Groups"	NA	NA	NA
V77	V78	V79	
NA	NA	NA	
> currow[urcols]			
	V74	V75	V76
"Total All Ethnic Groups"	NA	NA	NA
V77	V78	V79	
NA	NA	NA	
> cursub			
V82	V83	V84	V85
"European Only"	NA	NA	NA
			V86
			NA

```

      V87
      NA
> currow[curcols]
      V82      V83      V84      V85      V86
"European Only"      NA      NA      NA      NA
      V87
      NA
> cursub
      V90      V91      V92      V93      V94      V95
"Maori Only"      NA      NA      NA      NA      NA
> currow[curcols]
      V90      V91      V92      V93      V94      V95
"Maori Only"      NA      NA      NA      NA      NA
> cursub
      V98      V99      V100
"Pacific Peoples Only"      NA      NA
      V101      V102      V103
      NA      NA      NA
> currow[curcols]
      V98      V99      V100
"Pacific Peoples Only"      NA      NA
      V101      V102      V103
      NA      NA      NA
> cursub
      V106      V107      V108      V109      V110      V111
"Asian Only"      NA      NA      NA      NA      NA
> currow[curcols]
      V106      V107      V108      V109      V110      V111
"Asian Only"      NA      NA      NA      NA      NA
> cursub
      V114      V115      V116      V117      V118      V119
"MELAA Only"      NA      NA      NA      NA      NA
> currow[curcols]
      V114      V115      V116      V117      V118      V119
"MELAA Only"      NA      NA      NA      NA      NA
> cursub
      V122      V123      V124
"Other Ethnicity Only"      NA      NA
      V125      V126      V127
      NA      NA      NA
> currow[curcols]
      V122      V123      V124
"Other Ethnicity Only"      NA      NA
      V125      V126      V127
      NA      NA      NA
> cursub
      V130      V131      V132      V133
"European/Maori"      NA      NA      NA
      V134      V135
      NA      NA
> currow[curcols]
      V130      V131      V132      V133
"European/Maori"      NA      NA      NA
      V134      V135
      NA      NA
> cursub

```

V138

```

"Two or More Groups Not Elsewhere Included"
V139
NA
V140
NA
V141
NA
V142
NA
V143
NA
> currow[curcols]
V138
"Two or More Groups Not Elsewhere Included"
V139
NA
V140
NA
V141
NA
V142
NA
V143
NA
> cursub
V146
V147
V148
"Residual Categories"
NA
NA
V149
V150
V151
NA
NA
NA
> currow[curcols]
V146
V147
V148
"Residual Categories"
NA
NA
V149
V150
V151
NA
NA
NA
> cursub
V154
V155
V156
"Total All Ethnic Groups"
NA
NA
V157
V158
V159
NA
NA
NA
> currow[curcols]
V154
V155
V156
"Total All Ethnic Groups"
NA
NA
V157
V158
V159
NA
NA
NA
> cursub
V162
V163
V164
V165
V166
"European Only"
NA
NA
NA
NA
NA
V167
NA
NA
NA
NA
> currow[curcols]
V162
V163
V164
V165
V166
"European Only"
NA
NA
NA
NA
NA
V167
NA
NA
NA
NA
> cursub
V170
V171
V172
V173
V174
V175
"Maori Only"
NA
NA
NA
NA
NA

```

```

> currow[curcols]
      V170      V171      V172      V173      V174      V175
"Maori Only"      NA      NA      NA      NA      NA
> cursub
      V178      V179      V180
"Pacific Peoples Only"      NA      NA
      V181      V182      V183
      NA      NA      NA
> currow[curcols]
      V178      V179      V180
"Pacific Peoples Only"      NA      NA
      V181      V182      V183
      NA      NA      NA
> cursub
      V186      V187      V188      V189      V190      V191
"Asian Only"      NA      NA      NA      NA      NA
> currow[curcols]
      V186      V187      V188      V189      V190      V191
"Asian Only"      NA      NA      NA      NA      NA
> cursub
      V194      V195      V196      V197      V198      V199
"MELAA Only"      NA      NA      NA      NA      NA
> currow[curcols]
      V194      V195      V196      V197      V198      V199
"MELAA Only"      NA      NA      NA      NA      NA
> cursub
      V202      V203      V204
"Other Ethnicity Only"      NA      NA
      V205      V206      V207
      NA      NA      NA
> currow[curcols]
      V202      V203      V204
"Other Ethnicity Only"      NA      NA
      V205      V206      V207
      NA      NA      NA
> cursub
      V210      V211      V212      V213
"European/Maori"      NA      NA      NA
      V214      V215
      NA      NA
> currow[curcols]
      V210      V211      V212      V213
"European/Maori"      NA      NA      NA
      V214      V215
      NA      NA
> cursub
      V218
"Two or More Groups Not Elsewhere Included"
      V219
      NA
      V220
      NA
      V221
      NA
      V222
      NA
      V223

```

```

NA
> currow[curcols]
V218
"Two or More Groups Not Elsewhere Included"
V219
NA
V220
NA
V221
NA
V222
NA
V223
NA
> cursub
V226
V227
V228
"Residual Categories"
NA
NA
V229
V230
V231
NA
NA
NA
> currow[curcols]
V226
V227
V228
"Residual Categories"
NA
NA
V229
V230
V231
NA
NA
NA
> cursub
V234
V235
V236
"Total All Ethnic Groups"
NA
NA
V237
V238
V239
NA
NA
NA
> currow[curcols]
V234
V235
V236
"Total All Ethnic Groups"
NA
NA
V237
V238
V239
NA
NA
NA
> cursub
V2
V3
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V4
V5
"Not in Labour Force" "Working Age Population"
V6
V7
"Labour Force Participation Rate" "Unemployment Rate"
> currow[curcols]
V2
V3
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V4
V5
"Not in Labour Force" "Working Age Population"
V6
V7
"Labour Force Participation Rate" "Unemployment Rate"
> cursub
V10
V11
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V12
V13
"Not in Labour Force" "Working Age Population"
V14
V15
"Labour Force Participation Rate" "Unemployment Rate"
> currow[curcols]
V10
V11

```

"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V12	V13
"Not in Labour Force"	"Working Age Population"
V14	V15
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V18	V19
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V20	V21
"Not in Labour Force"	"Working Age Population"
V22	V23
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V18	V19
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V20	V21
"Not in Labour Force"	"Working Age Population"
V22	V23
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V26	V27
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V28	V29
"Not in Labour Force"	"Working Age Population"
V30	V31
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V26	V27
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V28	V29
"Not in Labour Force"	"Working Age Population"
V30	V31
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V34	V35
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V36	V37
"Not in Labour Force"	"Working Age Population"
V38	V39
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V34	V35
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V36	V37
"Not in Labour Force"	"Working Age Population"
V38	V39
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V42	V43
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V44	V45
"Not in Labour Force"	"Working Age Population"
V46	V47
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V42	V43
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"

	V44	V45
	"Not in Labour Force"	"Working Age Population"
	V46	V47
	"Labour Force Participation Rate"	"Unemployment Rate"
> cursub		
	V50	V51
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V52	V53
	"Not in Labour Force"	"Working Age Population"
	V54	V55
	"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]		
	V50	V51
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V52	V53
	"Not in Labour Force"	"Working Age Population"
	V54	V55
	"Labour Force Participation Rate"	"Unemployment Rate"
> cursub		
	V58	V59
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V60	V61
	"Not in Labour Force"	"Working Age Population"
	V62	V63
	"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]		
	V58	V59
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V60	V61
	"Not in Labour Force"	"Working Age Population"
	V62	V63
	"Labour Force Participation Rate"	"Unemployment Rate"
> cursub		
	V66	V67
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V68	V69
	"Not in Labour Force"	"Working Age Population"
	V70	V71
	"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]		
	V66	V67
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V68	V69
	"Not in Labour Force"	"Working Age Population"
	V70	V71
	"Labour Force Participation Rate"	"Unemployment Rate"
> cursub		
	V74	V75
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V76	V77
	"Not in Labour Force"	"Working Age Population"
	V78	V79
	"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]		
	V74	V75
	"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
	V76	V77

"Not in Labour Force"	"Working Age Population"
V78	V79
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V82	V83
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V84	V85
"Not in Labour Force"	"Working Age Population"
V86	V87
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V82	V83
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V84	V85
"Not in Labour Force"	"Working Age Population"
V86	V87
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V90	V91
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V92	V93
"Not in Labour Force"	"Working Age Population"
V94	V95
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V90	V91
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V92	V93
"Not in Labour Force"	"Working Age Population"
V94	V95
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V98	V99
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V100	V101
"Not in Labour Force"	"Working Age Population"
V102	V103
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V98	V99
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V100	V101
"Not in Labour Force"	"Working Age Population"
V102	V103
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V106	V107
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V108	V109
"Not in Labour Force"	"Working Age Population"
V110	V111
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V106	V107
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V108	V109
"Not in Labour Force"	"Working Age Population"

	V110	V111
"Labour Force Participation Rate"		"Unemployment Rate"
> cursub		
	V114	V115
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V116	V117
"Not in Labour Force"	"Working Age Population"	
	V118	V119
"Labour Force Participation Rate"		"Unemployment Rate"
> currow[curcols]		
	V114	V115
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V116	V117
"Not in Labour Force"	"Working Age Population"	
	V118	V119
"Labour Force Participation Rate"		"Unemployment Rate"
> cursub		
	V122	V123
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V124	V125
"Not in Labour Force"	"Working Age Population"	
	V126	V127
"Labour Force Participation Rate"		"Unemployment Rate"
> currow[curcols]		
	V122	V123
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V124	V125
"Not in Labour Force"	"Working Age Population"	
	V126	V127
"Labour Force Participation Rate"		"Unemployment Rate"
> cursub		
	V130	V131
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V132	V133
"Not in Labour Force"	"Working Age Population"	
	V134	V135
"Labour Force Participation Rate"		"Unemployment Rate"
> currow[curcols]		
	V130	V131
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V132	V133
"Not in Labour Force"	"Working Age Population"	
	V134	V135
"Labour Force Participation Rate"		"Unemployment Rate"
> cursub		
	V138	V139
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V140	V141
"Not in Labour Force"	"Working Age Population"	
	V142	V143
"Labour Force Participation Rate"		"Unemployment Rate"
> currow[curcols]		
	V138	V139
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V140	V141
"Not in Labour Force"	"Working Age Population"	
	V142	V143

"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V146	V147
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V148	V149
"Not in Labour Force"	"Working Age Population"
V150	V151
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V146	V147
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V148	V149
"Not in Labour Force"	"Working Age Population"
V150	V151
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V154	V155
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V156	V157
"Not in Labour Force"	"Working Age Population"
V158	V159
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V154	V155
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V156	V157
"Not in Labour Force"	"Working Age Population"
V158	V159
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V162	V163
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V164	V165
"Not in Labour Force"	"Working Age Population"
V166	V167
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V162	V163
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V164	V165
"Not in Labour Force"	"Working Age Population"
V166	V167
"Labour Force Participation Rate"	"Unemployment Rate"
> cursub	
V170	V171
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V172	V173
"Not in Labour Force"	"Working Age Population"
V174	V175
"Labour Force Participation Rate"	"Unemployment Rate"
> currow[curcols]	
V170	V171
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"
V172	V173
"Not in Labour Force"	"Working Age Population"
V174	V175
"Labour Force Participation Rate"	"Unemployment Rate"

```

> cursub
                                V178                                V179
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V180                                V181
                                "Not in Labour Force"                "Working Age Population"
                                V182                                V183
                                "Labour Force Participation Rate"      "Unemployment Rate"
> currow[curcols]
                                V178                                V179
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V180                                V181
                                "Not in Labour Force"                "Working Age Population"
                                V182                                V183
                                "Labour Force Participation Rate"      "Unemployment Rate"
> cursub
                                V186                                V187
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V188                                V189
                                "Not in Labour Force"                "Working Age Population"
                                V190                                V191
                                "Labour Force Participation Rate"      "Unemployment Rate"
> currow[curcols]
                                V186                                V187
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V188                                V189
                                "Not in Labour Force"                "Working Age Population"
                                V190                                V191
                                "Labour Force Participation Rate"      "Unemployment Rate"
> cursub
                                V194                                V195
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V196                                V197
                                "Not in Labour Force"                "Working Age Population"
                                V198                                V199
                                "Labour Force Participation Rate"      "Unemployment Rate"
> currow[curcols]
                                V194                                V195
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V196                                V197
                                "Not in Labour Force"                "Working Age Population"
                                V198                                V199
                                "Labour Force Participation Rate"      "Unemployment Rate"
> cursub
                                V202                                V203
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V204                                V205
                                "Not in Labour Force"                "Working Age Population"
                                V206                                V207
                                "Labour Force Participation Rate"      "Unemployment Rate"
> currow[curcols]
                                V202                                V203
"Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
                                V204                                V205
                                "Not in Labour Force"                "Working Age Population"
                                V206                                V207
                                "Labour Force Participation Rate"      "Unemployment Rate"
> cursub

```

	V210	V211
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V212	V213
"Not in Labour Force"	"Working Age Population"	
	V214	V215
"Labour Force Participation Rate"	"Unemployment Rate"	
> currow[curcols]		
	V210	V211
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V212	V213
"Not in Labour Force"	"Working Age Population"	
	V214	V215
"Labour Force Participation Rate"	"Unemployment Rate"	
> cursub		
	V218	V219
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V220	V221
"Not in Labour Force"	"Working Age Population"	
	V222	V223
"Labour Force Participation Rate"	"Unemployment Rate"	
> currow[curcols]		
	V218	V219
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V220	V221
"Not in Labour Force"	"Working Age Population"	
	V222	V223
"Labour Force Participation Rate"	"Unemployment Rate"	
> cursub		
	V226	V227
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V228	V229
"Not in Labour Force"	"Working Age Population"	
	V230	V231
"Labour Force Participation Rate"	"Unemployment Rate"	
> currow[curcols]		
	V226	V227
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V228	V229
"Not in Labour Force"	"Working Age Population"	
	V230	V231
"Labour Force Participation Rate"	"Unemployment Rate"	
> cursub		
	V234	V235
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V236	V237
"Not in Labour Force"	"Working Age Population"	
	V238	V239
"Labour Force Participation Rate"	"Unemployment Rate"	
> currow[curcols]		
	V234	V235
"Persons Employed in Labour Force"	"Persons Unemployed in Labour Force"	
	V236	V237
"Not in Labour Force"	"Working Age Population"	
	V238	V239
"Labour Force Participation Rate"	"Unemployment Rate"	
> matCollabel		
V2	V3	

```

[1,] NA NA
[2,] "Male" NA
[3,] "European Only" NA
[4,] "Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V4 V5
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Not in Labour Force" "Working Age Population"
V6 V7
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Labour Force Participation Rate" "Unemployment Rate"
> matColLabel
V2 V3
[1,] NA NA
[2,] "Male" NA
[3,] "European Only" NA
[4,] "Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V4 V5
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Not in Labour Force" "Working Age Population"
V6 V7
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Labour Force Participation Rate" "Unemployment Rate"
> matColLabel
V2 V3
[1,] NA NA
[2,] "Male" NA
[3,] "European Only" NA
[4,] "Persons Employed in Labour Force" "Persons Unemployed in Labour Force"
V4 V5
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Not in Labour Force" "Working Age Population"
V6 V7
[1,] NA NA
[2,] NA NA
[3,] NA NA
[4,] "Labour Force Participation Rate" "Unemployment Rate"
> res
$Male
$Male$rows
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
[51] 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75
[76] 76 77 78 79 80

$Male$cols
[1] 3 4

```

```

$Female
$Female$rows
[1] 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99
[20] 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118
[39] 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137
[58] 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156
[77] 157 158 159 160

$Female$cols
[1] 3 4

$'Total Both Sexes'
$'Total Both Sexes'$rows
[1] 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179
[20] 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198
[39] 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217
[58] 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236
[77] 237 238 239 240

$'Total Both Sexes'$cols
[1] 3 4

> res
$'European Only'
$'European Only'$rows
[1] 1 2 3 4 5 6 7 8

$'European Only'$cols
[1] 4

$'Maori Only'
$'Maori Only'$rows
[1] 9 10 11 12 13 14 15 16

$'Maori Only'$cols
[1] 4

$'Pacific Peoples Only'
$'Pacific Peoples Only'$rows
[1] 17 18 19 20 21 22 23 24

$'Pacific Peoples Only'$cols
[1] 4

$'Asian Only'
$'Asian Only'$rows
[1] 25 26 27 28 29 30 31 32

$'Asian Only'$cols
[1] 4

```

```
$'MELAA Only'
$'MELAA Only'$rows
[1] 33 34 35 36 37 38 39 40
```

```
$'MELAA Only'$cols
[1] 4
```

```
$'Other Ethnicity Only'
$'Other Ethnicity Only'$rows
[1] 41 42 43 44 45 46 47 48
```

```
$'Other Ethnicity Only'$cols
[1] 4
```

```
> plist
$rows
[1] 1 2 3 4 5 6 7 8
```

```
$cols
[1] 4
```

```
> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                1                                2
              Not in Labour Force              Working Age Population
                                3                                4
      Labour Force Participation Rate              Unemployment Rate
                                5                                6
```

```
> plist
$rows
[1] 9 10 11 12 13 14 15 16
```

```
$cols
[1] 4
```

```
> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                9                                10
              Not in Labour Force              Working Age Population
                                11                                12
      Labour Force Participation Rate              Unemployment Rate
                                13                                14
```

```
> plist
$rows
[1] 17 18 19 20 21 22 23 24
```

```
$cols
[1] 4
```

```
> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                17                                18
              Not in Labour Force              Working Age Population
                                19                                20
```



```

      Labour Force Participation Rate      Unemployment Rate
                                21                                22
> plist
$rows
[1] 25 26 27 28 29 30 31 32

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                25                                26
      Not in Labour Force      Working Age Population
                                27                                28
      Labour Force Participation Rate      Unemployment Rate
                                29                                30
> plist
$rows
[1] 33 34 35 36 37 38 39 40

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                33                                34
      Not in Labour Force      Working Age Population
                                35                                36
      Labour Force Participation Rate      Unemployment Rate
                                37                                38
> plist
$rows
[1] 41 42 43 44 45 46 47 48

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                41                                42
      Not in Labour Force      Working Age Population
                                43                                44
      Labour Force Participation Rate      Unemployment Rate
                                45                                46
> plist
$rows
[1] 49 50 51 52 53 54 55 56

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                49                                50
      Not in Labour Force      Working Age Population
                                51                                52
      Labour Force Participation Rate      Unemployment Rate

```

```

53
54

> plist
$rows
[1] 57 58 59 60 61 62 63 64

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                57                                58
              Not in Labour Force              Working Age Population
                                59                                60
Labour Force Participation Rate                                Unemployment Rate
                                61                                62

> plist
$rows
[1] 65 66 67 68 69 70 71 72

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                65                                66
              Not in Labour Force              Working Age Population
                                67                                68
Labour Force Participation Rate                                Unemployment Rate
                                69                                70

> plist
$rows
[1] 73 74 75 76 77 78 79 80

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                73                                74
              Not in Labour Force              Working Age Population
                                75                                76
Labour Force Participation Rate                                Unemployment Rate
                                77                                78

> res
$'European Only'
$'European Only'$rows
[1] 81 82 83 84 85 86 87 88

$'European Only'$cols
[1] 4

$'Maori Only'
$'Maori Only'$rows
[1] 89 90 91 92 93 94 95 96

$'Maori Only'$cols

```

```
[1] 4
```

```
$'Pacific Peoples Only'  
$'Pacific Peoples Only'$rows  
[1] 97 98 99 100 101 102 103 104
```

```
$'Pacific Peoples Only'$cols  
[1] 4
```

```
$'Asian Only'  
$'Asian Only'$rows  
[1] 105 106 107 108 109 110 111 112
```

```
$'Asian Only'$cols  
[1] 4
```

```
$'MELAA Only'  
$'MELAA Only'$rows  
[1] 113 114 115 116 117 118 119 120
```

```
$'MELAA Only'$cols  
[1] 4
```

```
$'Other Ethnicity Only'  
$'Other Ethnicity Only'$rows  
[1] 121 122 123 124 125 126 127 128
```

```
$'Other Ethnicity Only'$cols  
[1] 4
```

```
> plist  
$rows  
[1] 81 82 83 84 85 86 87 88
```

```
$cols  
[1] 4
```

```
> res  
Persons Employed in Labour Force Persons Unemployed in Labour Force  
81 82  
Not in Labour Force Working Age Population  
83 84  
Labour Force Participation Rate Unemployment Rate  
85 86
```

```
> plist  
$rows  
[1] 89 90 91 92 93 94 95 96
```

```
$cols  
[1] 4
```

```
> res
```

```

Persons Employed in Labour Force Persons Unemployed in Labour Force
                                89                                90
                                Not in Labour Force          Working Age Population
                                91                                92
Labour Force Participation Rate          Unemployment Rate
                                93                                94

> plist
$rows
[1] 97 98 99 100 101 102 103 104

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                97                                98
                                Not in Labour Force          Working Age Population
                                99                                100
Labour Force Participation Rate          Unemployment Rate
                                101                                102

> plist
$rows
[1] 105 106 107 108 109 110 111 112

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                105                                106
                                Not in Labour Force          Working Age Population
                                107                                108
Labour Force Participation Rate          Unemployment Rate
                                109                                110

> plist
$rows
[1] 113 114 115 116 117 118 119 120

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                113                                114
                                Not in Labour Force          Working Age Population
                                115                                116
Labour Force Participation Rate          Unemployment Rate
                                117                                118

> plist
$rows
[1] 121 122 123 124 125 126 127 128

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force

```

	121		122
Not in Labour Force		Working Age Population	
	123		124
Labour Force Participation Rate		Unemployment Rate	
	125		126

```

> plist
$rows
[1] 129 130 131 132 133 134 135 136

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
129 130
Not in Labour Force Working Age Population
131 132
Labour Force Participation Rate Unemployment Rate
133 134

> plist
$rows
[1] 137 138 139 140 141 142 143 144

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
137 138
Not in Labour Force Working Age Population
139 140
Labour Force Participation Rate Unemployment Rate
141 142

> plist
$rows
[1] 145 146 147 148 149 150 151 152

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
145 146
Not in Labour Force Working Age Population
147 148
Labour Force Participation Rate Unemployment Rate
149 150

> plist
$rows
[1] 153 154 155 156 157 158 159 160

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
153 154

```

Not in Labour Force	Working Age Population
155	156
Labour Force Participation Rate	Unemployment Rate
157	158

```

> res
$'European Only'
$'European Only'$rows
[1] 161 162 163 164 165 166 167 168

$'European Only'$cols
[1] 4

$'Maori Only'
$'Maori Only'$rows
[1] 169 170 171 172 173 174 175 176

$'Maori Only'$cols
[1] 4

$'Pacific Peoples Only'
$'Pacific Peoples Only'$rows
[1] 177 178 179 180 181 182 183 184

$'Pacific Peoples Only'$cols
[1] 4

$'Asian Only'
$'Asian Only'$rows
[1] 185 186 187 188 189 190 191 192

$'Asian Only'$cols
[1] 4

$'MELAA Only'
$'MELAA Only'$rows
[1] 193 194 195 196 197 198 199 200

$'MELAA Only'$cols
[1] 4

$'Other Ethnicity Only'
$'Other Ethnicity Only'$rows
[1] 201 202 203 204 205 206 207 208

$'Other Ethnicity Only'$cols
[1] 4

> plist
$rows
[1] 161 162 163 164 165 166 167 168

```

```

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                161                                162
                                Not in Labour Force                Working Age Population
                                163                                164
Labour Force Participation Rate                                Unemployment Rate
                                165                                166

> plist
$rows
[1] 169 170 171 172 173 174 175 176

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                169                                170
                                Not in Labour Force                Working Age Population
                                171                                172
Labour Force Participation Rate                                Unemployment Rate
                                173                                174

> plist
$rows
[1] 177 178 179 180 181 182 183 184

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                177                                178
                                Not in Labour Force                Working Age Population
                                179                                180
Labour Force Participation Rate                                Unemployment Rate
                                181                                182

> plist
$rows
[1] 185 186 187 188 189 190 191 192

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                185                                186
                                Not in Labour Force                Working Age Population
                                187                                188
Labour Force Participation Rate                                Unemployment Rate
                                189                                190

> plist
$rows
[1] 193 194 195 196 197 198 199 200

$cols

```

```

[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                        193                        194
                Not in Labour Force                Working Age Population
                        195                        196
    Labour Force Participation Rate                Unemployment Rate
                        197                        198

> plist
$rows
[1] 201 202 203 204 205 206 207 208

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                        201                        202
                Not in Labour Force                Working Age Population
                        203                        204
    Labour Force Participation Rate                Unemployment Rate
                        205                        206

> plist
$rows
[1] 209 210 211 212 213 214 215 216

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                        209                        210
                Not in Labour Force                Working Age Population
                        211                        212
    Labour Force Participation Rate                Unemployment Rate
                        213                        214

> plist
$rows
[1] 217 218 219 220 221 222 223 224

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                        217                        218
                Not in Labour Force                Working Age Population
                        219                        220
    Labour Force Participation Rate                Unemployment Rate
                        221                        222

> plist
$rows
[1] 225 226 227 228 229 230 231 232

$cols
[1] 4

```



```

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                225                                226
                                Not in Labour Force                Working Age Population
                                227                                228
Labour Force Participation Rate                                Unemployment Rate
                                229                                230

> plist
$rows
[1] 233 234 235 236 237 238 239 240

$cols
[1] 4

> res
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                233                                234
                                Not in Labour Force                Working Age Population
                                235                                236
Labour Force Participation Rate                                Unemployment Rate
                                237                                238

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                1                                2
                                Not in Labour Force                Working Age Population
                                3                                4
Labour Force Participation Rate                                Unemployment Rate
                                5                                6

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> datbit
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                9                                10
                                Not in Labour Force                Working Age Population
                                11                                12
Labour Force Participation Rate                                Unemployment Rate
                                13                                14

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"

```

```

[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V10      V11      V12      V13      V14      V15
[1,] "71.1" "6.1" "28.1" "105.3" "73.4" "7.9"
[2,] "69.1" "7.5" "31.4" "107.9" "71.0" "9.7"
[3,] "67.2" "5.7" "27.4" "100.2" "72.7" "7.8"
[4,] "71.7" "8.7" "30.7" "111.1" "72.3" "10.8"
[5,] "76.1" "8.5" "28.5" "113.1" "74.8" "10.0"
[6,] "75.4" "8.4" "35.7" "119.5" "70.1" "10.1"
> plist
      Persons Employed in Labour Force Persons Unemployed in Labour Force
                                17                                18
              Not in Labour Force              Working Age Population
                                19                                20
      Labour Force Participation Rate              Unemployment Rate
                                21                                22
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V18      V19      V20      V21      V22      V23
[1,] "42.8" "1.5" "18.9" "63.2" "70.1" "3.5"
[2,] "41.1" "3.4" "18.1" "62.6" "71.1" "7.6"
[3,] "42.2" "2.4" "18.0" "62.5" "71.2" "5.3"
[4,] "45.2" "3.3" "19.4" "67.9" "71.5" "6.9"
[5,] "47.7" "3.3" "17.5" "68.4" "74.5" "6.4"
[6,] "41.9" "7.3" "18.4" "67.6" "72.8" "14.8"
> plist
      Persons Employed in Labour Force Persons Unemployed in Labour Force
                                25                                26
              Not in Labour Force              Working Age Population
                                27                                28
      Labour Force Participation Rate              Unemployment Rate
                                29                                30
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V26      V27      V28      V29      V30      V31
[1,] "95.9" "5.2" "32.2" "133.2" "75.9" "5.1"
[2,] "90.9" "3.8" "36.4" "131.2" "72.2" "4.1"
[3,] "98.3" "4.2" "44.5" "146.9" "69.7" "4.1"
[4,] "101.3" "3.8" "41.0" "146.0" "71.9" "3.6"
[5,] "106.4" "6.2" "33.9" "146.6" "76.9" "5.5"
[6,] "99.7" "6.6" "40.1" "146.4" "72.6" "6.2"

```

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> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                33                                34
                                Not in Labour Force                Working Age Population
                                35                                36
Labour Force Participation Rate                                Unemployment Rate
                                37                                38

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> datbit
      V34 V35 V36 V37 V38 V39
[1,] "9.8" NA  "3.5" "14.2" "75.0" NA
[2,] "9.3" NA  "4.9" "14.7" "66.4" NA
[3,] "9.6" "2.0" "3.3" "14.9" "77.7" "17.2"
[4,] "8.1" NA  "6.7" "15.5" "57.1" NA
[5,] "8.4" NA  "4.7" "13.7" "66.0" NA
[6,] "8.1" NA  "5.0" "14.1" "64.7" NA

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                41                                42
                                Not in Labour Force                Working Age Population
                                43                                44
Labour Force Participation Rate                                Unemployment Rate
                                45                                46

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> datbit
      V42 V43 V44 V45 V46 V47
[1,] "5.9" NA  "1.1" "7.2" "84.1" NA
[2,] "6.8" NA  "1.9" "9.2" "79.8" NA
[3,] "11.2" NA "2.9" "14.6" "80.0" NA
[4,] "10.5" NA "4.1" "14.7" "71.9" NA
[5,] "13.5" NA "4.1" "18.1" "77.1" NA
[6,] "16.6" NA "5.4" "22.3" "75.6" NA

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                49                                50
                                Not in Labour Force                Working Age Population
                                51                                52
Labour Force Participation Rate                                Unemployment Rate
                                53                                54

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"

```

```

[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V50      V51      V52      V53      V54      V55
[1,] "60.1" "4.7" "13.9" "78.8" "82.4" "7.3"
[2,] "56.9" "4.4" "19.6" "80.9" "75.8" "7.2"
[3,] "64.3" "5.2" "18.9" "88.4" "78.6" "7.5"
[4,] "57.2" "4.6" "18.2" "80.0" "77.3" "7.5"
[5,] "57.9" "4.0" "17.2" "79.2" "78.2" "6.4"
[6,] "49.2" "6.3" "17.0" "72.4" "76.6" "11.3"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                57                                58
              Not in Labour Force              Working Age Population
                                59                                60
Labour Force Participation Rate                                Unemployment Rate
                                61                                62
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V58      V59      V60      V61      V62      V63
[1,] "28.2" "1.2" "7.1" "36.5" "80.5" "4.0"
[2,] "17.0" "1.6" "5.4" "24.0" "77.6" "8.7"
[3,] "17.2" NA    "5.5" "23.5" "76.7" "4.8"
[4,] "18.1" NA    "5.0" "23.7" "79.0" "3.1"
[5,] "17.6" "1.2" "4.5" "23.3" "80.7" "6.5"
[6,] "16.3" "2.4" "5.8" "24.5" "76.2" "12.6"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                65                                66
              Not in Labour Force              Working Age Population
                                67                                68
Labour Force Participation Rate                                Unemployment Rate
                                69                                70
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V66      V67      V68      V69      V70      V71
[1,] "7.3" NA    "1.7" "9.3" "81.8" NA
[2,] "4.1" NA    "2.6" "6.9" "62.4" NA
[3,] "2.7" NA    "3.0" "5.7" "46.8" NA
[4,] "2.9" NA    NA    "3.3" "88.8" NA
[5,] "1.6" NA    NA    "2.2" "81.6" NA

```

```

[6,] "2.2" NA NA "3.1" "88.9" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                73                                74
              Not in Labour Force              Working Age Population
                                75                                76
Labour Force Participation Rate                                Unemployment Rate
                                77                                78

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> datbit
      V74      V75      V76      V77      V78      V79
[1,] "1176.9" "40.1" "386.6" "1603.6" "75.9" "3.3"
[2,] "1158.3" "47.4" "403.7" "1609.4" "74.9" "3.9"
[3,] "1162.7" "46.6" "404.2" "1613.5" "74.9" "3.9"
[4,] "1154.7" "51.5" "411.4" "1617.6" "74.6" "4.3"
[5,] "1184.1" "53.8" "385.5" "1623.4" "76.3" "4.3"
[6,] "1154.4" "68.2" "407.1" "1629.7" "75.0" "5.6"

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                81                                82
              Not in Labour Force              Working Age Population
                                83                                84
Labour Force Participation Rate                                Unemployment Rate
                                85                                86

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"

> datbit
      V82      V83      V84      V85      V86      V87
[1,] "763.3" "16.6" "441.6" "1221.6" "63.8" "2.1"
[2,] "737.5" "24.5" "456.5" "1218.5" "62.5" "3.2"
[3,] "744.6" "19.8" "442.5" "1206.9" "63.3" "2.6"
[4,] "746.3" "21.5" "439.2" "1207.0" "63.6" "2.8"
[5,] "754.8" "23.6" "437.1" "1215.4" "64.0" "3.0"
[6,] "735.5" "29.6" "441.3" "1206.5" "63.4" "3.9"

> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                89                                90
              Not in Labour Force              Working Age Population
                                91                                92
Labour Force Participation Rate                                Unemployment Rate
                                93                                94

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"

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[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V90      V91      V92      V93      V94      V95
[1,] "62.7" "6.5" "49.2" "118.4" "58.4" "9.4"
[2,] "60.5" "7.3" "54.9" "122.8" "55.3" "10.8"
[3,] "59.0" "5.4" "47.1" "111.5" "57.8" "8.4"
[4,] "62.0" "5.6" "50.5" "118.0" "57.2" "8.2"
[5,] "65.7" "6.9" "46.8" "119.3" "60.8" "9.5"
[6,] "65.4" "8.4" "51.9" "125.6" "58.7" "11.4"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                97                                98
              Not in Labour Force              Working Age Population
                                99                                100
Labour Force Participation Rate                                Unemployment Rate
                                101                                102
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V98      V99      V100      V101      V102      V103
[1,] "36.9" "2.8" "31.4" "71.2" "55.9" "7.1"
[2,] "33.4" "3.7" "33.3" "70.4" "52.7" "10.0"
[3,] "34.9" "3.2" "31.7" "69.8" "54.6" "8.3"
[4,] "39.0" "3.6" "33.9" "76.5" "55.7" "8.5"
[5,] "37.7" "4.0" "32.0" "73.7" "56.6" "9.5"
[6,] "35.1" "4.9" "37.9" "77.8" "51.3" "12.2"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                105                                106
              Not in Labour Force              Working Age Population
                                107                                108
Labour Force Participation Rate                                Unemployment Rate
                                109                                110
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V106      V107      V108      V109      V110      V111
[1,] "76.2" "4.7" "64.1" "145.0" "55.8" "5.8"
[2,] "79.0" "6.6" "70.7" "156.3" "54.8" "7.7"
[3,] "87.6" "5.9" "69.5" "163.0" "57.4" "6.3"
[4,] "86.4" "5.4" "68.4" "160.3" "57.3" "5.9"

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[5,] "89.9" "6.9" "66.5" "163.3" "59.3" "7.2"
[6,] "93.6" "7.3" "69.2" "170.1" "59.3" "7.2"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                113                                114
                Not in Labour Force                Working Age Population
                                115                                116
Labour Force Participation Rate                                Unemployment Rate
                                117                                118
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V114 V115 V116 V117 V118 V119
[1,] "4.3" NA   "8.2" "13.2" "37.9" NA
[2,] "5.0" "1.2" "7.4" "13.6" "45.4" "19.0"
[3,] "6.6" "1.0" "8.9" "16.5" "45.8" "13.4"
[4,] "6.8" NA   "9.5" "17.2" "44.7" NA
[5,] "4.2" NA   "6.4" "11.5" "43.9" NA
[6,] "4.3" NA   "7.0" "12.0" "41.9" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                121                                122
                Not in Labour Force                Working Age Population
                                123                                124
Labour Force Participation Rate                                Unemployment Rate
                                125                                126
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V122 V123 V124 V125 V126 V127
[1,] "5.7" NA   "1.9" "7.6" "74.6" NA
[2,] "6.6" NA   "4.2" "10.9" "61.4" NA
[3,] "8.8" "1.1" "6.6" "16.6" "60.0" "11.4"
[4,] "11.4" NA  "6.9" "19.0" "63.7" NA
[5,] "12.6" NA  "7.6" "20.9" "63.5" NA
[6,] "14.6" NA  "7.6" "22.7" "66.5" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                129                                130
                Not in Labour Force                Working Age Population
                                131                                132
Labour Force Participation Rate                                Unemployment Rate
                                133                                134
> matData
      V2      V3      V4      V5      V6      V7

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[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V130  V131  V132  V133  V134  V135
[1,] "54.1" "2.4" "28.2" "84.7" "66.7" "4.2"
[2,] "55.3" "4.2" "27.2" "86.7" "68.7" "7.1"
[3,] "59.8" "3.8" "34.3" "97.8" "65.0" "5.9"
[4,] "57.2" "3.5" "31.5" "92.2" "65.9" "5.7"
[5,] "60.3" "4.9" "25.6" "90.8" "71.7" "7.5"
[6,] "51.6" "6.9" "26.2" "84.7" "69.0" "11.8"
> plist
      Persons Employed in Labour Force  Persons Unemployed in Labour Force
                                137                                138
      Not in Labour Force                                Working Age Population
                                139                                140
      Labour Force Participation Rate                                Unemployment Rate
                                141                                142
> matData
      V2  V3  V4  V5  V6  V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V138  V139  V140  V141  V142  V143
[1,] "21.5" "1.8" "13.0" "36.3" "64.1" "7.7"
[2,] "15.6" NA   "9.2"  "25.3" "63.8" NA
[3,] "17.5" NA   "10.4" "28.6" "63.6" NA
[4,] "16.4" "1.1" "8.8"  "26.4" "66.5" "6.5"
[5,] "16.4" "1.1" "10.1" "27.6" "63.3" "6.4"
[6,] "17.7" "2.2" "10.1" "30.0" "66.4" "11.1"
> plist
      Persons Employed in Labour Force  Persons Unemployed in Labour Force
                                145                                146
      Not in Labour Force                                Working Age Population
                                147                                148
      Labour Force Participation Rate                                Unemployment Rate
                                149                                150
> matData
      V2  V3  V4  V5  V6  V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V146  V147  V148  V149  V150  V151
[1,] "5.8" NA   "4.0" "10.1" "60.0" NA
[2,] "5.6" NA   "2.7" "8.6"  "69.0" NA
[3,] "2.8" NA   "3.3" "6.1"  "45.9" NA

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[4,] "3.3" NA    NA    "3.9" "86.4" NA
[5,] "2.3" NA    NA    "3.1" "75.7" NA
[6,] NA     NA    NA    "1.7" "63.3" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                153                                154
              Not in Labour Force              Working Age Population
                                155                                156
Labour Force Participation Rate              Unemployment Rate
                                157                                158
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V154      V155      V156      V157      V158      V159
[1,] "1030.6" "35.7" "641.7" "1708.0" "62.4" "3.3"
[2,] "998.6"  "48.6" "666.1" "1713.3" "61.1" "4.6"
[3,] "1021.6" "40.8" "654.4" "1716.8" "61.9" "3.8"
[4,] "1028.9" "42.4" "649.2" "1720.5" "62.3" "4.0"
[5,] "1043.9" "49.0" "633.0" "1725.8" "63.3" "4.5"
[6,] "1018.6" "60.6" "651.8" "1731.1" "62.3" "5.6"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                161                                162
              Not in Labour Force              Working Age Population
                                163                                164
Labour Force Participation Rate              Unemployment Rate
                                165                                166
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V162      V163      V164      V165      V166      V167
[1,] "1619.1" "36.6" "721.7" "2377.4" "69.6" "2.2"
[2,] "1600.5" "49.9" "740.0" "2390.5" "69.0" "3.0"
[3,] "1594.7" "45.7" "723.2" "2363.6" "69.4" "2.8"
[4,] "1585.9" "51.3" "725.1" "2362.3" "69.3" "3.1"
[5,] "1609.6" "53.1" "711.7" "2374.3" "70.0" "3.2"
[6,] "1580.5" "65.0" "720.8" "2366.2" "69.5" "3.9"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                169                                170
              Not in Labour Force              Working Age Population
                                171                                172
Labour Force Participation Rate              Unemployment Rate
                                173                                174
> matData

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      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V170    V171    V172    V173    V174    V175
[1,] "133.8" "12.6" "77.3" "223.7" "65.5" "8.6"
[2,] "129.7" "14.8" "86.3" "230.8" "62.6" "10.2"
[3,] "126.2" "11.1" "74.5" "211.8" "64.8" "8.1"
[4,] "133.7" "14.2" "81.2" "229.1" "64.6" "9.6"
[5,] "141.7" "15.3" "75.4" "232.4" "67.6" "9.8"
[6,] "140.8" "16.8" "87.6" "245.2" "64.3" "10.7"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                177                                178
              Not in Labour Force              Working Age Population
                                179                                180
Labour Force Participation Rate                                Unemployment Rate
                                181                                182
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V178    V179    V180    V181    V182    V183
[1,] "79.7" "4.4" "50.3" "134.4" "62.6" "5.2"
[2,] "74.5" "7.1" "51.4" "133.0" "61.3" "8.7"
[3,] "77.1" "5.5" "49.7" "132.3" "62.4" "6.7"
[4,] "84.2" "7.0" "53.2" "144.5" "63.2" "7.7"
[5,] "85.4" "7.2" "49.5" "142.1" "65.2" "7.8"
[6,] "77.0" "12.2" "56.3" "145.4" "61.3" "13.6"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                185                                186
              Not in Labour Force              Working Age Population
                                187                                188
Labour Force Participation Rate                                Unemployment Rate
                                189                                190
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V186    V187    V188    V189    V190    V191
[1,] "172.1" "9.9" "96.3" "278.3" "65.4" "5.4"
[2,] "169.9" "10.5" "107.1" "287.5" "62.8" "5.8"

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[3,] "186.0" "10.1" "113.9" "310.0" "63.2" "5.1"
[4,] "187.7" "9.2" "109.5" "306.3" "64.3" "4.7"
[5,] "196.3" "13.2" "100.4" "309.9" "67.6" "6.3"
[6,] "193.3" "13.9" "109.3" "316.5" "65.5" "6.7"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                193                                194
              Not in Labour Force              Working Age Population
                                195                                196
Labour Force Participation Rate                                Unemployment Rate
                                197                                198
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V194 V195 V196 V197 V198 V199
[1,] "14.1" "1.5" "11.7" "27.3" "57.1" "9.6"
[2,] "14.3" "1.7" "12.4" "28.3" "56.3" "10.4"
[3,] "16.1" "3.0" "12.3" "31.4" "61.0" "15.7"
[4,] "14.9" "1.6" "16.2" "32.8" "50.6" "9.9"
[5,] "12.6" "1.5" "11.1" "25.2" "55.9" "10.7"
[6,] "12.4" "1.7" "12.0" "26.1" "54.2" "12.0"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                201                                202
              Not in Labour Force              Working Age Population
                                203                                204
Labour Force Participation Rate                                Unemployment Rate
                                205                                206
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V202 V203 V204 V205 V206 V207
[1,] "11.6" NA   "3.1" "14.8" "79.2" NA
[2,] "13.4" NA   "6.1" "20.1" "69.8" NA
[3,] "20.0" "1.6" "9.6" "31.2" "69.3" "7.2"
[4,] "21.9" NA   "11.0" "33.7" "67.3" NA
[5,] "26.1" "1.1" "11.8" "39.0" "69.8" "4.1"
[6,] "31.2" NA   "13.0" "44.9" "71.0" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                209                                210
              Not in Labour Force              Working Age Population
                                211                                212
Labour Force Participation Rate                                Unemployment Rate
                                213                                214

```

```

> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V210      V211      V212      V213      V214      V215
[1,] "114.3" "7.1" "42.1" "163.5" "74.3" "5.9"
[2,] "112.2" "8.7" "46.8" "167.6" "72.1" "7.2"
[3,] "124.0" "8.9" "53.2" "186.2" "71.4" "6.7"
[4,] "114.4" "8.1" "49.6" "172.2" "71.2" "6.6"
[5,] "118.2" "8.8" "42.9" "169.9" "74.8" "7.0"
[6,] "100.7" "13.2" "43.2" "157.1" "72.5" "11.6"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                217                                218
              Not in Labour Force              Working Age Population
                                219                                220
Labour Force Participation Rate                                Unemployment Rate
                                221                                222
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V218      V219      V220      V221      V222      V223
[1,] "49.7" "3.0" "20.1" "72.8" "72.3" "5.6"
[2,] "32.6" "2.2" "14.5" "49.3" "70.5" "6.2"
[3,] "34.7" "1.6" "15.9" "52.1" "69.5" "4.3"
[4,] "34.6" "1.7" "13.8" "50.1" "72.4" "4.7"
[5,] "34.0" "2.3" "14.6" "50.9" "71.3" "6.5"
[6,] "34.0" "4.6" "15.9" "54.5" "70.8" "11.8"
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                225                                226
              Not in Labour Force              Working Age Population
                                227                                228
Labour Force Participation Rate                                Unemployment Rate
                                229                                230
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V226      V227      V228      V229      V230      V231
[1,] "13.1" NA      "5.7" "19.5" "70.5" NA

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[2,] "9.7" NA "5.3" "15.6" "66.1" NA
[3,] "5.5" NA "6.3" "11.8" "46.3" NA
[4,] "6.3" NA NA "7.2" "87.5" NA
[5,] "4.0" NA "1.2" "5.3" "78.1" NA
[6,] "3.0" NA NA "4.8" "79.9" NA
> plist
Persons Employed in Labour Force Persons Unemployed in Labour Force
                                233                                234
              Not in Labour Force              Working Age Population
                                235                                236
Labour Force Participation Rate              Unemployment Rate
                                237                                238
> matData
      V2      V3      V4      V5      V6      V7
[1,] "855.8" "20.0" "280.0" "1155.8" "75.8" "2.3"
[2,] "863.0" "25.4" "283.5" "1171.9" "75.8" "2.9"
[3,] "850.1" "26.0" "280.7" "1156.8" "75.7" "3.0"
[4,] "839.6" "29.8" "285.9" "1155.3" "75.2" "3.4"
[5,] "854.8" "29.5" "274.7" "1158.9" "76.3" "3.3"
[6,] "845.0" "35.4" "279.4" "1159.8" "75.9" "4.0"
> datbit
      V234      V235      V236      V237      V238      V239
[1,] "2207.5" "75.8" "1028.3" "3311.6" "68.9" "3.3"
[2,] "2156.9" "96.0" "1069.8" "3322.7" "67.8" "4.3"
[3,] "2184.3" "87.5" "1058.6" "3330.3" "68.2" "3.9"
[4,] "2183.6" "93.9" "1060.6" "3338.1" "68.2" "4.1"
[5,] "2227.9" "102.8" "1018.5" "3349.2" "69.6" "4.4"
[6,] "2173.0" "128.8" "1058.9" "3360.8" "68.5" "5.6"
> colplist
$Male
+ European Only (1, 3)
- + Persons Employed in Labour Force (1, 4)
- + Persons Unemployed in Labour Force (2, 4)
- + Not in Labour Force (3, 4)
- + Working Age Population (4, 4)
- + Labour Force Participation Rate (5, 4)
- + Unemployment Rate (6, 4)
- + Employment Rate (7, 4)
- + Total Labour Force (8, 4)
+ Maori Only (9, 3)
- + Persons Employed in Labour Force (9, 4)
- + Persons Unemployed in Labour Force (10, 4)
- + Not in Labour Force (11, 4)
- + Working Age Population (12, 4)
- + Labour Force Participation Rate (13, 4)
- + Unemployment Rate (14, 4)
- + Employment Rate (15, 4)
- + Total Labour Force (16, 4)
+ Pacific Peoples Only (17, 3)
- + Persons Employed in Labour Force (17, 4)
- + Persons Unemployed in Labour Force (18, 4)
- + Not in Labour Force (19, 4)
- + Working Age Population (20, 4)
- + Labour Force Participation Rate (21, 4)
- + Unemployment Rate (22, 4)
- + Employment Rate (23, 4)
- + Total Labour Force (24, 4)

```

- + Asian Only (25, 3)
- + Persons Employed in Labour Force (25, 4)
- + Persons Unemployed in Labour Force (26, 4)
- + Not in Labour Force (27, 4)
- + Working Age Population (28, 4)
- + Labour Force Participation Rate (29, 4)
- + Unemployment Rate (30, 4)
- + Employment Rate (31, 4)
- + Total Labour Force (32, 4)
- + MELAA Only (33, 3)
- + Persons Employed in Labour Force (33, 4)
- + Persons Unemployed in Labour Force (34, 4)
- + Not in Labour Force (35, 4)
- + Working Age Population (36, 4)
- + Labour Force Participation Rate (37, 4)
- + Unemployment Rate (38, 4)
- + Employment Rate (39, 4)
- + Total Labour Force (40, 4)
- + Other Ethnicity Only (41, 3)
- + Persons Employed in Labour Force (41, 4)
- + Persons Unemployed in Labour Force (42, 4)
- + Not in Labour Force (43, 4)
- + Working Age Population (44, 4)
- + Labour Force Participation Rate (45, 4)
- + Unemployment Rate (46, 4)
- + Employment Rate (47, 4)
- + Total Labour Force (48, 4)
- + European/Maori (49, 3)
- + Persons Employed in Labour Force (49, 4)
- + Persons Unemployed in Labour Force (50, 4)
- + Not in Labour Force (51, 4)
- + Working Age Population (52, 4)
- + Labour Force Participation Rate (53, 4)
- + Unemployment Rate (54, 4)
- + Employment Rate (55, 4)
- + Total Labour Force (56, 4)
- + Two or More Groups Not Elsewhere Included (57, 3)
- + Persons Employed in Labour Force (57, 4)
- + Persons Unemployed in Labour Force (58, 4)
- + Not in Labour Force (59, 4)
- + Working Age Population (60, 4)
- + Labour Force Participation Rate (61, 4)
- + Unemployment Rate (62, 4)
- + Employment Rate (63, 4)
- + Total Labour Force (64, 4)
- + Residual Categories (65, 3)
- + Persons Employed in Labour Force (65, 4)
- + Persons Unemployed in Labour Force (66, 4)
- + Not in Labour Force (67, 4)
- + Working Age Population (68, 4)
- + Labour Force Participation Rate (69, 4)
- + Unemployment Rate (70, 4)
- + Employment Rate (71, 4)
- + Total Labour Force (72, 4)
- + Total All Ethnic Groups (73, 3)
- + Persons Employed in Labour Force (73, 4)
- + Persons Unemployed in Labour Force (74, 4)

- + Not in Labour Force (75, 4)
- + Working Age Population (76, 4)
- + Labour Force Participation Rate (77, 4)
- + Unemployment Rate (78, 4)
- + Employment Rate (79, 4)
- + Total Labour Force (80, 4)

\$Female

- + European Only (81, 3)
 - + Persons Employed in Labour Force (81, 4)
 - + Persons Unemployed in Labour Force (82, 4)
 - + Not in Labour Force (83, 4)
 - + Working Age Population (84, 4)
 - + Labour Force Participation Rate (85, 4)
 - + Unemployment Rate (86, 4)
 - + Employment Rate (87, 4)
 - + Total Labour Force (88, 4)
- + Maori Only (89, 3)
 - + Persons Employed in Labour Force (89, 4)
 - + Persons Unemployed in Labour Force (90, 4)
 - + Not in Labour Force (91, 4)
 - + Working Age Population (92, 4)
 - + Labour Force Participation Rate (93, 4)
 - + Unemployment Rate (94, 4)
 - + Employment Rate (95, 4)
 - + Total Labour Force (96, 4)
- + Pacific Peoples Only (97, 3)
 - + Persons Employed in Labour Force (97, 4)
 - + Persons Unemployed in Labour Force (98, 4)
 - + Not in Labour Force (99, 4)
 - + Working Age Population (100, 4)
 - + Labour Force Participation Rate (101, 4)
 - + Unemployment Rate (102, 4)
 - + Employment Rate (103, 4)
 - + Total Labour Force (104, 4)
- + Asian Only (105, 3)
 - + Persons Employed in Labour Force (105, 4)
 - + Persons Unemployed in Labour Force (106, 4)
 - + Not in Labour Force (107, 4)
 - + Working Age Population (108, 4)
 - + Labour Force Participation Rate (109, 4)
 - + Unemployment Rate (110, 4)
 - + Employment Rate (111, 4)
 - + Total Labour Force (112, 4)
- + MELAA Only (113, 3)
 - + Persons Employed in Labour Force (113, 4)
 - + Persons Unemployed in Labour Force (114, 4)
 - + Not in Labour Force (115, 4)
 - + Working Age Population (116, 4)
 - + Labour Force Participation Rate (117, 4)
 - + Unemployment Rate (118, 4)
 - + Employment Rate (119, 4)
 - + Total Labour Force (120, 4)
- + Other Ethnicity Only (121, 3)
 - + Persons Employed in Labour Force (121, 4)
 - + Persons Unemployed in Labour Force (122, 4)
 - + Not in Labour Force (123, 4)

- + Working Age Population (124, 4)
- + Labour Force Participation Rate (125, 4)
- + Unemployment Rate (126, 4)
- + Employment Rate (127, 4)
- + Total Labour Force (128, 4)
- + European/Maori (129, 3)
 - + Persons Employed in Labour Force (129, 4)
 - + Persons Unemployed in Labour Force (130, 4)
 - + Not in Labour Force (131, 4)
- + Working Age Population (132, 4)
- + Labour Force Participation Rate (133, 4)
- + Unemployment Rate (134, 4)
- + Employment Rate (135, 4)
- + Total Labour Force (136, 4)
- + Two or More Groups Not Elsewhere Included (137, 3)
 - + Persons Employed in Labour Force (137, 4)
 - + Persons Unemployed in Labour Force (138, 4)
 - + Not in Labour Force (139, 4)
- + Working Age Population (140, 4)
- + Labour Force Participation Rate (141, 4)
- + Unemployment Rate (142, 4)
- + Employment Rate (143, 4)
- + Total Labour Force (144, 4)
- + Residual Categories (145, 3)
 - + Persons Employed in Labour Force (145, 4)
 - + Persons Unemployed in Labour Force (146, 4)
 - + Not in Labour Force (147, 4)
- + Working Age Population (148, 4)
- + Labour Force Participation Rate (149, 4)
- + Unemployment Rate (150, 4)
- + Employment Rate (151, 4)
- + Total Labour Force (152, 4)
- + Total All Ethnic Groups (153, 3)
 - + Persons Employed in Labour Force (153, 4)
 - + Persons Unemployed in Labour Force (154, 4)
 - + Not in Labour Force (155, 4)
- + Working Age Population (156, 4)
- + Labour Force Participation Rate (157, 4)
- + Unemployment Rate (158, 4)
- + Employment Rate (159, 4)
- + Total Labour Force (160, 4)
- \$'Total Both Sexes'
- + European Only (161, 3)
 - + Persons Employed in Labour Force (161, 4)
 - + Persons Unemployed in Labour Force (162, 4)
 - + Not in Labour Force (163, 4)
- + Working Age Population (164, 4)
- + Labour Force Participation Rate (165, 4)
- + Unemployment Rate (166, 4)
- + Employment Rate (167, 4)
- + Total Labour Force (168, 4)
- + Maori Only (169, 3)
 - + Persons Employed in Labour Force (169, 4)
 - + Persons Unemployed in Labour Force (170, 4)
 - + Not in Labour Force (171, 4)
- + Working Age Population (172, 4)

- + Labour Force Participation Rate (173, 4)
- + Unemployment Rate (174, 4)
- + Employment Rate (175, 4)
- + Total Labour Force (176, 4)
- + Pacific Peoples Only (177, 3)
- + Persons Employed in Labour Force (177, 4)
- + Persons Unemployed in Labour Force (178, 4)
- + Not in Labour Force (179, 4)
- + Working Age Population (180, 4)
- + Labour Force Participation Rate (181, 4)
- + Unemployment Rate (182, 4)
- + Employment Rate (183, 4)
- + Total Labour Force (184, 4)
- + Asian Only (185, 3)
- + Persons Employed in Labour Force (185, 4)
- + Persons Unemployed in Labour Force (186, 4)
- + Not in Labour Force (187, 4)
- + Working Age Population (188, 4)
- + Labour Force Participation Rate (189, 4)
- + Unemployment Rate (190, 4)
- + Employment Rate (191, 4)
- + Total Labour Force (192, 4)
- + MELAA Only (193, 3)
- + Persons Employed in Labour Force (193, 4)
- + Persons Unemployed in Labour Force (194, 4)
- + Not in Labour Force (195, 4)
- + Working Age Population (196, 4)
- + Labour Force Participation Rate (197, 4)
- + Unemployment Rate (198, 4)
- + Employment Rate (199, 4)
- + Total Labour Force (200, 4)
- + Other Ethnicity Only (201, 3)
- + Persons Employed in Labour Force (201, 4)
- + Persons Unemployed in Labour Force (202, 4)
- + Not in Labour Force (203, 4)
- + Working Age Population (204, 4)
- + Labour Force Participation Rate (205, 4)
- + Unemployment Rate (206, 4)
- + Employment Rate (207, 4)
- + Total Labour Force (208, 4)
- + European/Maori (209, 3)
- + Persons Employed in Labour Force (209, 4)
- + Persons Unemployed in Labour Force (210, 4)
- + Not in Labour Force (211, 4)
- + Working Age Population (212, 4)
- + Labour Force Participation Rate (213, 4)
- + Unemployment Rate (214, 4)
- + Employment Rate (215, 4)
- + Total Labour Force (216, 4)
- + Two or More Groups Not Elsewhere Included (217, 3)
- + Persons Employed in Labour Force (217, 4)
- + Persons Unemployed in Labour Force (218, 4)
- + Not in Labour Force (219, 4)
- + Working Age Population (220, 4)
- + Labour Force Participation Rate (221, 4)
- + Unemployment Rate (222, 4)
- + Employment Rate (223, 4)

- + Total Labour Force (224, 4)
- + Residual Categories (225, 3)
- + Persons Employed in Labour Force (225, 4)
- + Persons Unemployed in Labour Force (226, 4)
- + Not in Labour Force (227, 4)
- + Working Age Population (228, 4)
- + Labour Force Participation Rate (229, 4)
- + Unemployment Rate (230, 4)
- + Employment Rate (231, 4)
- + Total Labour Force (232, 4)
- + Total All Ethnic Groups (233, 3)
- + Persons Employed in Labour Force (233, 4)
- + Persons Unemployed in Labour Force (234, 4)
- + Not in Labour Force (235, 4)
- + Working Age Population (236, 4)
- + Labour Force Participation Rate (237, 4)
- + Unemployment Rate (238, 4)
- + Employment Rate (239, 4)
- + Total Labour Force (240, 4)

> res

	UNKNOWN	UNKNOWN	UNKNOWN	Persons Employed in Labour Force
1	Male European Only	2007Q4		855.8
2	Male European Only	2008Q1		863.0
3	Male European Only	2008Q2		850.1
4	Male European Only	2008Q3		839.6
5	Male European Only	2008Q4		854.8
6	Male European Only	2009Q1		845.0
	Persons Unemployed in Labour Force	Not in Labour Force	Working Age Population	
1		20.0	280.0	1155.8
2		25.4	283.5	1171.9
3		26.0	280.7	1156.8
4		29.8	285.9	1155.3
5		29.5	274.7	1158.9
6		35.4	279.4	1159.8
	Labour Force Participation Rate	Unemployment Rate	Employment Rate	
1		75.8	2.3	74.0
2		75.8	2.9	73.6
3		75.7	3.0	73.5
4		75.2	3.4	72.7
5		76.3	3.3	73.8
6		75.9	4.0	72.9
	Total Labour Force			
1		875.8		
2		888.5		
3		876.1		
4		869.4		
5		884.2		
6		880.4		

8.7 ToyExByEmptyBelow.csv

	1	2	3	4	5	6
1			Column 1	Column 2	Column 3	Column 4
2	Row Parent1	Row Child1	10	20	30	40
3		Row Child2	11	21	31	41
4	Row Parent2	Row Child1	12	22	32	42
5		Row Child2	13	23	33	43

```

> rowData
[1] 2 5
> colData
[1] 3 6
> rowslist
$label
[1] 1

$data
[1] 2 3 4 5

> colslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 1 2

$'Row Parent1'$cols
[1] 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 3 4

$'Row Parent2'$cols
[1] 2

> plist
$rows
[1] 1 2

$cols
[1] 2

> res
Row Child1 Row Child2
      1      2
> plist
$rows

```

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[1] 3 4

$cols
[1] 2

> res
Row Child1 Row Child2
      3      4
> rowplist
$'Row Parent1'
+ Row Child1 (1, 2)
+ Row Child2 (2, 2)

$'Row Parent2'
+ Row Child1 (3, 2)
+ Row Child2 (4, 2)

> rowvecs
      [,1]      [,2]
[1,] "Row Parent1" "Row Child1"
[2,] "Row Parent1" "Row Child2"
[3,] "Row Parent2" "Row Child1"
[4,] "Row Parent2" "Row Child2"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> cursub
      V3      V4      V5      V6
"Column 1" "Column 2" "Column 3" "Column 4"
> currow[curcols]
      V3      V4      V5      V6
"Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> plist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> matData
      V3      V4      V5      V6
[1,] "10" "20" "30" "40"

```

```

[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> datbit
      V3  V4  V5  V6
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> colplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> res
      UNKNOWN      UNKNOWN Column 1 Column 2 Column 3 Column 4
1 Row Parent1 Row Child1      10      20      30      40
2 Row Parent1 Row Child2      11      21      31      41
3 Row Parent2 Row Child1      12      22      32      42
4 Row Parent2 Row Child2      13      23      33      43

```

8.8 ToyExByEmptyBelowT.csv

	1	2	3	4	5	6
1		Row Parent1		Row Parent2		
2		Row Child1	Row Child2	Row Child1	Row Child2	
3	Column 1	10	11	12	13	
4	Column 2	20	21	22	23	
5	Column 3	30	31	32	33	
6	Column 4	40	41	42	43	

```

> rowData
[1] 3 6
> colData
[1] 2 5
> rowslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> colslist
$label
[1] 1

$data
[1] 2 3 4 5

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> rowplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> rowvecs
[,1]
[1,] "Column 1"
[2,] "Column 2"
[3,] "Column 3"
[4,] "Column 4"
> matColLabel
      V2      V3      V4      V5
[1,] "Row Parent1" NA      "Row Parent2" NA
[2,] "Row Child1"  "Row Child2" "Row Child1"  "Row Child2"
> cursub
      V2      V3
"Row Parent1" NA
> currow[curcols]
      V2      V3

```

```

"Row Parent1"      NA
> cursub
      V4      V5
"Row Parent2"      NA
> currow[curcols]
      V4      V5
"Row Parent2"      NA
> cursub
      V2      V3
"Row Child1" "Row Child2"
> currow[curcols]
      V2      V3
"Row Child1" "Row Child2"
> cursub
      V4      V5
"Row Child1" "Row Child2"
> currow[curcols]
      V4      V5
"Row Child1" "Row Child2"
> matColLabel
      V2      V3      V4      V5
[1,] "Row Parent1" NA      "Row Parent2" NA
[2,] "Row Child1"  "Row Child2" "Row Child1" "Row Child2"
> matColLabel
      V2      V3      V4      V5
[1,] "Row Parent1" NA      "Row Parent2" NA
[2,] "Row Child1"  "Row Child2" "Row Child1" "Row Child2"
> matColLabel
      V2      V3      V4      V5
[1,] "Row Parent1" NA      "Row Parent2" NA
[2,] "Row Child1"  "Row Child2" "Row Child1" "Row Child2"
> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 1 2

$'Row Parent1'$cols
[1] 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 3 4

$'Row Parent2'$cols
[1] 2

> plist
$rows
[1] 1 2

$cols
[1] 2

> res
Row Child1 Row Child2

```

```

      1      2
> plist
$rows
[1] 3 4

$cols
[1] 2

> res
Row Child1 Row Child2
      3      4
> plist
Row Child1 Row Child2
      1      2
> matData
      V2 V3 V4 V5
[1,] "10" "11" "12" "13"
[2,] "20" "21" "22" "23"
[3,] "30" "31" "32" "33"
[4,] "40" "41" "42" "43"
> datbit
      V2 V3
[1,] "10" "11"
[2,] "20" "21"
[3,] "30" "31"
[4,] "40" "41"
> plist
Row Child1 Row Child2
      3      4
> matData
      V2 V3 V4 V5
[1,] "10" "11" "12" "13"
[2,] "20" "21" "22" "23"
[3,] "30" "31" "32" "33"
[4,] "40" "41" "42" "43"
> datbit
      V4 V5
[1,] "12" "13"
[2,] "22" "23"
[3,] "32" "33"
[4,] "42" "43"
> colplist
$'Row Parent1'
+ Row Child1 (1, 2)
+ Row Child2 (2, 2)

$'Row Parent2'
+ Row Child1 (3, 2)
+ Row Child2 (4, 2)

> res
UNKNOWN UNKNOWN Row Child1 Row Child2
1 Row Parent1 Column 1      10      11
2 Row Parent1 Column 2      20      21
3 Row Parent1 Column 3      30      31
4 Row Parent1 Column 4      40      41
5 Row Parent2 Column 1      12      13

```


8.9 ToyExByEmptyRight1.csv

	1	2	3	4	5	6	7
1				Column 1	Column 2	Column 3	Column 4
2	Row Parent1			10	20	30	40
3	Row Child1	Row Child-Child1		11	21	31	41
4	Row Child2	Row Child-Child2		12	22	32	42
5	Row Parent2			13	23	33	43
6	Row Child1	Row Child-Child1		14	24	34	44
7		Row Child-Child2		15	25	35	45

```

> rowData
[1] 2 7
> colData
[1] 4 7
> rowslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7

> colslist
$label
[1] 1 2

$data
[1] 4 5 6 7

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 2 3

$'Row Parent1'$cols
[1] 1 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 5 6

$'Row Parent2'$cols
[1] 1 2

> res
$'Row Child1'
$'Row Child1'$rows
[1] 2

$'Row Child1'$cols
[1] 2

$'Row Child2'
$'Row Child2'$rows

```

```

[1] 3

$'Row Child2'$cols
[1] 2

> plist
$rows
[1] 2

$cols
[1] 2

> res
Row Child-Child1
                2

> plist
$rows
[1] 3

$cols
[1] 2

> res
Row Child-Child2
                3

> res
$'Row Child1'
$'Row Child1'$rows
[1] 5 6

$'Row Child1'$cols
[1] 2

> plist
$rows
[1] 5 6

$cols
[1] 2

> res
Row Child-Child1 Row Child-Child2
                5                6

> rowplist
$'Row Parent1'
+ Row Child1 (2, 1)
- + Row Child-Child1 (2, 2)
+ Row Child2 (3, 1)
- + Row Child-Child2 (3, 2)

$'Row Parent2'
+ Row Child1 (5, 1)
- + Row Child-Child1 (5, 2)
- + Row Child-Child2 (6, 2)

```

```

> rowvecs
      [,1]      [,2]      [,3]
V2 "Row Parent1" "Row Child1" "Row Child-Child1"
V2 "Row Parent1" "Row Child2" "Row Child-Child2"
   "Row Parent2" "Row Child1" "Row Child-Child1"
   "Row Parent2" "Row Child1" "Row Child-Child2"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> cursub
      V4      V5      V6      V7
"Column 1" "Column 2" "Column 3" "Column 4"
> currow[curcols]
      V4      V5      V6      V7
"Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> plist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> matData
      V4  V5  V6  V7
[1,] "11" "21" "31" "41"
[2,] "12" "22" "32" "42"
[3,] "14" "24" "34" "44"
[4,] "15" "25" "35" "45"
> datbit
      V4  V5  V6  V7
[1,] "11" "21" "31" "41"
[2,] "12" "22" "32" "42"
[3,] "14" "24" "34" "44"
[4,] "15" "25" "35" "45"
> colplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> res
      UNKNOWN      UNKNOWN      UNKNOWN Column 1 Column 2 Column 3 Column 4
1 Row Parent1 Row Child1 Row Child-Child1      11      21      31      41
2 Row Parent1 Row Child2 Row Child-Child2      12      22      32      42
3 Row Parent2 Row Child1 Row Child-Child1      14      24      34      44

```

4	Row	Parent2	Row	Child1	Row	Child-Child2	15	25	35	45
---	-----	---------	-----	--------	-----	--------------	----	----	----	----

8.10 ToyExByEmptyRight2.csv

	1	2	3	4	5	6
1			Column 1	Column 2	Column 3	Column 4
2	Row Parent1		10	20	30	40
3		Row Child1	11	21	31	41
4		Row Child2	12	22	32	42
5	Row Parent2		13	23	33	43
6		Row Child1	14	24	34	44
7		Row Child2	15	25	35	45

```

> rowData
[1] 2 7
> colData
[1] 3 6
> rowslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7

> colslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 2 3

$'Row Parent1'$cols
[1] 1 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 5 6

$'Row Parent2'$cols
[1] 1 2

> plist
$rows
[1] 2 3

$cols
[1] 2

> res
Row Child1 Row Child2
      2      3

```

```

> plist
$rows
[1] 5 6

$cols
[1] 2

> res
Row Child1 Row Child2
      5      6
> rowplist
$'Row Parent1'
+ Row Child1 (2, 2)
+ Row Child2 (3, 2)

$'Row Parent2'
+ Row Child1 (5, 2)
+ Row Child2 (6, 2)

> rowvecs
      [,1]      [,2]
[1,] "Row Parent1" "Row Child1"
[2,] "Row Parent1" "Row Child2"
[3,] "Row Parent2" "Row Child1"
[4,] "Row Parent2" "Row Child2"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> cursub
      V3      V4      V5      V6
"Column 1" "Column 2" "Column 3" "Column 4"
> currow[curcols]
      V3      V4      V5      V6
"Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V3      V4      V5      V6
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> plist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> matData

```

```

      V3   V4   V5   V6
[1,] "11" "21" "31" "41"
[2,] "12" "22" "32" "42"
[3,] "14" "24" "34" "44"
[4,] "15" "25" "35" "45"
> datbit
      V3   V4   V5   V6
[1,] "11" "21" "31" "41"
[2,] "12" "22" "32" "42"
[3,] "14" "24" "34" "44"
[4,] "15" "25" "35" "45"
> colplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> res
      UNKNOWN      UNKNOWN Column 1 Column 2 Column 3 Column 4
1 Row Parent1 Row Child1      11      21      31      41
2 Row Parent1 Row Child2      12      22      32      42
3 Row Parent2 Row Child1      14      24      34      44
4 Row Parent2 Row Child2      15      25      35      45

```


8.11 ToyExByEmptyRight3.csv

	1	2	3	4	5	6	7	8
1				Column 1	Column 2	Column 3	Column 4	
2	Row Super-Parent1			10	20	30	40	
3	Row Parent1			11	21	31	41	
4	Row Child1	Row Child-Child1		12	22	32	42	
5	Row Parent2			13	23	33	43	
6	Row Child1	Row Child-Child1		14	24	34	44	
7	Row Super-Parent2			15	25	35	45	
8	Row Parent1			16	26	36	46	
9	Row Child1	Row Child-Child1		17	27	37	47	
10	Row Parent2			18	28	38	48	
11	Row Child1	Row Child-Child1		19	29	39	49	

```

> rowData
[1] 2 11
> colData
[1] 4 7
> rowslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7 8 9 10 11

> colslist
$label
[1] 1 2

$data
[1] 4 5 6 7

> res
$'Row Super-Parent1'
$'Row Super-Parent1'$rows
[1] 2 3 4 5

$'Row Super-Parent1'$cols
[1] 1 2

$'Row Super-Parent2'
$'Row Super-Parent2'$rows
[1] 7 8 9 10

$'Row Super-Parent2'$cols
[1] 1 2

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 3

$'Row Parent1'$cols
[1] 1 2

```

```

$'Row Parent2'
$'Row Parent2'$rows
[1] 5

$'Row Parent2'$cols
[1] 1 2

> plist
$rows
[1] 3

$cols
[1] 1 2

> res
$'Row Child1'
+ Row Child-Child1 (3, 2)

> plist
$rows
[1] 5

$cols
[1] 1 2

> res
$'Row Child1'
+ Row Child-Child1 (5, 2)

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 8

$'Row Parent1'$cols
[1] 1 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 10

$'Row Parent2'$cols
[1] 1 2

> plist
$rows
[1] 8

$cols
[1] 1 2

> res
$'Row Child1'

```

```

+ Row Child-Child1 (8, 2)

> plist
$rows
[1] 10

$cols
[1] 1 2

> res
$'Row Child1'
+ Row Child-Child1 (10, 2)

> rowplist
$'Row Super-Parent1'
+ Row Parent1 (2, 1)
- + Row Child1 (3, 1)
- - + Row Child-Child1 (3, 2)
+ Row Parent2 (4, 1)
- + Row Child1 (5, 1)
- - + Row Child-Child1 (5, 2)

$'Row Super-Parent2'
+ Row Parent1 (7, 1)
- + Row Child1 (8, 1)
- - + Row Child-Child1 (8, 2)
+ Row Parent2 (9, 1)
- + Row Child1 (10, 1)
- - + Row Child-Child1 (10, 2)

> rowvecs
      [,1]      [,2]      [,3]      [,4]
V2 "Row Super-Parent1" "Row Parent1" "Row Child1" "Row Child-Child1"
V2 "Row Super-Parent1" "Row Parent2" "Row Child1" "Row Child-Child1"
V2 "Row Super-Parent2" "Row Parent1" "Row Child1" "Row Child-Child1"
V2 "Row Super-Parent2" "Row Parent2" "Row Child1" "Row Child-Child1"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> cursub
      V4      V5      V6      V7
"Column 1" "Column 2" "Column 3" "Column 4"
> currow[curcols]
      V4      V5      V6      V7
"Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V4      V5      V6      V7
[1,] "Column 1" "Column 2" "Column 3" "Column 4"
> plist
$rows
[1] 1 2 3 4

```

```

$cols
[1] 1

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4

> plist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4

> matData
      V4  V5  V6  V7
[1,] "12" "22" "32" "42"
[2,] "14" "24" "34" "44"
[3,] "17" "27" "37" "47"
[4,] "19" "29" "39" "49"

> datbit
      V4  V5  V6  V7
[1,] "12" "22" "32" "42"
[2,] "14" "24" "34" "44"
[3,] "17" "27" "37" "47"
[4,] "19" "29" "39" "49"

> colplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4

> res
      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN Column 1 Column 2
1 Row Super-Parent1 Row Parent1 Row Child1 Row Child-Child1      12      22
2 Row Super-Parent1 Row Parent2 Row Child1 Row Child-Child1      14      24
3 Row Super-Parent2 Row Parent1 Row Child1 Row Child-Child1      17      27
4 Row Super-Parent2 Row Parent2 Row Child1 Row Child-Child1      19      29
      Column 3 Column 4
1      32      42
2      34      44
3      37      47
4      39      49

```

8.12 ToyExComplete.csv

	1	2	3	4	5	6	7	8	9	10	11
1	MISC INFORMATION										
2					Col Parent1				Col Parent2		
3				Col	Col	Col	Col	Col	Col	Col	Col
4				Child1	Child2	Child3	Child4	Child1	Child2	Child3	Child4
5	Row Super-Parent			10	20	30	40	50	60	70	80
6	Row Parent1			11	21	31	41	51	61	71	81
7	Row Child1			12	22	32	42	52	62	72	82
8	Row Child-Child1			13	23	33	43	53	63	73	83
9	Row Child-Child2			14	24	34	44	54	64	74	84
10	Row Child2			15	25	35	45	55	65	75	85
11	Row Child-Child1			16	26	36	46	56	66	76	86
12	Row Parent2			17	27	37	47	57	67	77	87
13	Row Child1			18	28	38	48	58	68	78	88
14	Row Child-Child1			19	29	39	49	59	69	79	89
15	MISC INFORMATION										
16	MISC INFORMATION										

```

> rowData
[1] 5 14
> colData
[1] 4 11
> rowslist
$label
[1] 1 2 3 4

$data
[1] 5 6 7 8 9 10 11 12 13 14

> colslist
$label
[1] 1 2

$data
[1] 4 5 6 7 8 9 10 11

> res
$'Row Super-Parent'
$'Row Super-Parent'$rows
[1] 2 3 4 5 6 7 8 9 10

$'Row Super-Parent'$cols
[1] 1 2

> res
$'Row Parent1'
$'Row Parent1'$rows
[1] 3 4 5 6

$'Row Parent1'$cols
[1] 1 2

$'Row Parent2'
$'Row Parent2'$rows
[1] 8 9 10

$'Row Parent2'$cols
[1] 1 2

```

```

> res
$'Row Child1'
$'Row Child1'$rows
[1] 3 4

$'Row Child1'$cols
[1] 2

$'Row Child2'
$'Row Child2'$rows
[1] 5 6

$'Row Child2'$cols
[1] 2

> plist
$rows
[1] 3 4

$cols
[1] 2

> res
Row Child-Child1 Row Child-Child2
              3              4

> plist
$rows
[1] 5 6

$cols
[1] 2

> res
Row Child-Child1 Row Child-Child2
              5              6

> res
$'Row Child1'
$'Row Child1'$rows
[1] 8 9

$'Row Child1'$cols
[1] 2

$'Row Child2'
$'Row Child2'$rows
[1] 10

$'Row Child2'$cols
[1] 2

> plist
$rows

```

```

[1] 8 9

$cols
[1] 2

> res
Row Child-Child1 Row Child-Child2
              8              9

> plist
$rows
[1] 10

$cols
[1] 2

> res
Row Child-Child2
              10

> rowplist
$'Row Super-Parent'
+ Row Parent1 (2, 1)
- + Row Child1 (3, 1)
- - + Row Child-Child1 (3, 2)
- - + Row Child-Child2 (4, 2)
- + Row Child2 (5, 1)
- - + Row Child-Child1 (5, 2)
- - + Row Child-Child2 (6, 2)
+ Row Parent2 (7, 1)
- + Row Child1 (8, 1)
- - + Row Child-Child1 (8, 2)
- - + Row Child-Child2 (9, 2)
- + Row Child2 (10, 1)
- - + Row Child-Child2 (10, 2)

> rowvecs
[,1]          [,2]          [,3]          [,4]
"Row Super-Parent" "Row Parent1" "Row Child1" "Row Child-Child1"
"Row Super-Parent" "Row Parent1" "Row Child1" "Row Child-Child2"
"Row Super-Parent" "Row Parent1" "Row Child2" "Row Child-Child1"
"Row Super-Parent" "Row Parent1" "Row Child2" "Row Child-Child2"
"Row Super-Parent" "Row Parent2" "Row Child1" "Row Child-Child1"
"Row Super-Parent" "Row Parent2" "Row Child1" "Row Child-Child2"
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] NA      "Col Parent1" NA      NA      NA      "Col Parent2"
[3,] "Col"    "Col"    "Col"    "Col"    "Col"    "Col"
[4,] "Child1" "Child2"  "Child3" "Child4" "Child1" "Child2"
> cursub
      V4      V5      V6      V7
      NA "Col Parent1" NA      NA
> currow[curcols]
      V4      V5      V6      V7
"Col Parent1" NA      NA      NA
> cursub
      V8      V9      V10     V11
      NA "Col Parent2" NA      NA

```

```

> currow[curcols]
      V8      V9      V10      V11
"Col Parent2"  NA      NA      NA
> cursub
      V4
"Col"
> currow[curcols]
      V4
"Col"
> cursub
      V5
"Col"
> currow[curcols]
      V5
"Col"
> cursub
      V6
"Col"
> currow[curcols]
      V6
"Col"
> cursub
      V7
"Col"
> currow[curcols]
      V7
"Col"
> cursub
      V8
"Col"
> currow[curcols]
      V8
"Col"
> cursub
      V9
"Col"
> currow[curcols]
      V9
"Col"
> cursub
      V10
"Col"
> currow[curcols]
      V10
"Col"
> cursub
      V11
"Col"
> currow[curcols]
      V11
"Col"
> cursub
      V4      V5      V6      V7
"Child1" "Child2" "Child3" "Child4"
> currow[curcols]
      V4      V5      V6      V7
"Child1" "Child2" "Child3" "Child4"

```



```

> cursub
      V8      V9      V10      V11
"Child1" "Child2" "Child3" "Child4"
> currow[curcols]
      V8      V9      V10      V11
"Child1" "Child2" "Child3" "Child4"
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2" NA
[3,] "Col"      "Col"      "Col"      "Col"      "Col"      "Col"
[4,] "Child1"      "Child2" "Child3" "Child4" "Child1"      "Child2"
> matColLabel
      V4      V5      V6      V7      V8      V9
[1,] NA      NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2" NA
[3,] "Col"      "Col"      "Col"      "Col"      "Col"      "Col"
[4,] "Child1"      "Child2" "Child3" "Child4" "Child1"      "Child2"
> matColLabel
      V4      V5      V6      V7      V8
[1,] NA      NA      NA      NA      NA
[2,] "Col Parent1" NA      NA      NA      "Col Parent2"
[3,] "Col Child1" "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V9
[1,] NA
[2,] NA
[3,] "Col Child2"
> res
$'Col Parent1'
$'Col Parent1'$rows
[1] 1 2 3 4

$'Col Parent1'$cols
[1] 3

$'Col Parent2'
$'Col Parent2'$rows
[1] 5 6 7 8

$'Col Parent2'$cols
[1] 3

> plist
$rows
[1] 1 2 3 4

$cols
[1] 3

> res
Col Child1 Col Child2 Col Child3 Col Child4
      1      2      3      4
> plist
$rows
[1] 5 6 7 8

```

```

$cols
[1] 3

> res
Col Child1 Col Child2 Col Child3 Col Child4
      5         6         7         8

> plist
Col Child1 Col Child2 Col Child3 Col Child4
      1         2         3         4

> matData
      V4  V5  V6  V7  V8  V9
[1,] "12" "22" "32" "42" "52" "62"
[2,] "13" "23" "33" "43" "53" "63"
[3,] "14" "24" "34" "44" "54" "64"
[4,] "15" "25" "35" "45" "55" "65"
[5,] "17" "27" "37" "47" "57" "67"
[6,] "18" "28" "38" "48" "58" "68"

> datbit
      V4  V5  V6  V7
[1,] "12" "22" "32" "42"
[2,] "13" "23" "33" "43"
[3,] "14" "24" "34" "44"
[4,] "15" "25" "35" "45"
[5,] "17" "27" "37" "47"
[6,] "18" "28" "38" "48"

> plist
Col Child1 Col Child2 Col Child3 Col Child4
      5         6         7         8

> matData
      V4  V5  V6  V7  V8  V9
[1,] "12" "22" "32" "42" "52" "62"
[2,] "13" "23" "33" "43" "53" "63"
[3,] "14" "24" "34" "44" "54" "64"
[4,] "15" "25" "35" "45" "55" "65"
[5,] "17" "27" "37" "47" "57" "67"
[6,] "18" "28" "38" "48" "58" "68"

> datbit
      V8  V9  V10 V11
[1,] "52" "62" "72" "82"
[2,] "53" "63" "73" "83"
[3,] "54" "64" "74" "84"
[4,] "55" "65" "75" "85"
[5,] "57" "67" "77" "87"
[6,] "58" "68" "78" "88"

> colplist
$'Col Parent1'
+ Col Child1 (1, 3)
+ Col Child2 (2, 3)
+ Col Child3 (3, 3)
+ Col Child4 (4, 3)

$'Col Parent2'
+ Col Child1 (5, 3)
+ Col Child2 (6, 3)
+ Col Child3 (7, 3)
+ Col Child4 (8, 3)

```

```

> res
      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN      UNKNOWN
1 Col Parent1 Row Super-Parent Row Parent1 Row Child1 Row Child-Child1
2 Col Parent1 Row Super-Parent Row Parent1 Row Child1 Row Child-Child2
3 Col Parent1 Row Super-Parent Row Parent1 Row Child2 Row Child-Child1
4 Col Parent1 Row Super-Parent Row Parent1 Row Child2 Row Child-Child2
5 Col Parent1 Row Super-Parent Row Parent2 Row Child1 Row Child-Child1
6 Col Parent1 Row Super-Parent Row Parent2 Row Child1 Row Child-Child2
  Col Child1 Col Child2 Col Child3 Col Child4
1         12         22         32         42
2         13         23         33         43
3         14         24         34         44
4         15         25         35         45
5         17         27         37         47
6         18         28         38         48

```

8.13 ToyExFindSingleTable.csv

	1	2	3	4	5	6
1	MISC INFORMATION					
2	MISC INFORMATION					
3		Column 1	Column 2	Column 3	Column 4	
4	Row 1	10	20	30	40	
5	Row 2	11	21	31	41	
6	Row 3	12	22	32	42	
7	Row 4	13	23	33	43	
8	MISC INFORMATION		MISC INFORMATION			
9	MISC INFORMATION		MISC INFORMATION			

```

> rowData
[1] 4 7
> colData
[1] 2 5
> rowslist
$label
[1] 1 2 3

$data
[1] 4 5 6 7

> colslist
$label
[1] 1

$data
[1] 2 3 4 5

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
   1    2    3    4
> rowplist
Row 1 Row 2 Row 3 Row 4
   1    2    3    4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V3      V4      V5
[1,] NA      NA      NA      NA
[2,] NA      NA      NA      NA
[3,] "Column 1" "Column 2" "Column 3" "Column 4"
> cursub

```

```

      V2      V3      V4      V5
"Column 1" "Column 2" "Column 3" "Column 4"
> currow[curcols]
      V2      V3      V4      V5
"Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V2      V3      V4      V5
[1,] NA      NA      NA      NA
[2,] NA      NA      NA      NA
[3,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V2      V3      V4      V5
[1,] NA      NA      NA      NA
[2,] NA      NA      NA      NA
[3,] "Column 1" "Column 2" "Column 3" "Column 4"
> matColLabel
      V2      V3      V4      V5
[1,] NA      NA      NA      NA
[2,] NA      NA      NA      NA
[3,] "Column 1" "Column 2" "Column 3" "Column 4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 3

> res
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> plist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> matData
      V2 V3 V4 V5
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> datbit
      V2 V3 V4 V5
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> colplist
Column 1 Column 2 Column 3 Column 4
      1      2      3      4
> res
UNKNOWN Column 1 Column 2 Column 3 Column 4
1 Row 1      10      20      30      40
2 Row 2      11      21      31      41
3 Row 3      12      22      32      42
4 Row 4      13      23      33      43

```

8.14 ToyExIrregularColumnLabels.csv

	1	2	3	4	5	6	7
1		Col Parent1			Col Parent2		
2		Col Child1	Col Child2	Col Child3	Col Child1	Col Child2	Col Child4
3	Row 1	10	20	30	50	60	80
4	Row 2	11	21	31	51	61	81
5	Row 3	12	22	32	52	62	82
6	Row 4	13	23	33	53	63	83

```

> rowData
[1] 3 6
> colData
[1] 2 7
> rowslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> colslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
    1    2    3    4
> rowplist
Row 1 Row 2 Row 3 Row 4
    1    2    3    4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      "Col Parent2" NA
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child1" "Col Child2"
      V7
[1,] NA
[2,] "Col Child4"
> cursub
      V2      V3      V4
"Col Parent1"      NA      NA

```

```

> currow[curcols]
      V2      V3      V4
"Col Parent1"      NA      NA
> cursub
      V5      V6      V7
"Col Parent2"      NA      NA
> currow[curcols]
      V5      V6      V7
"Col Parent2"      NA      NA
> cursub
      V2      V3      V4      V5      V6      V7
"Col Child1" "Col Child2" "Col Child3" "Col Child1" "Col Child2" "Col Child4"
> currow[curcols]
      V2      V3      V4      V5      V6      V7
"Col Child1" "Col Child2" "Col Child3" "Col Child1" "Col Child2" "Col Child4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      "Col Parent2" NA
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child1" "Col Child2"
      V7
[1,] NA
[2,] "Col Child4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      "Col Parent2" NA
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child1" "Col Child2"
      V7
[1,] NA
[2,] "Col Child4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      "Col Parent2" NA
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child1" "Col Child2"
      V7
[1,] NA
[2,] "Col Child4"
> res
$'Col Parent1'
$'Col Parent1'$rows
[1] 1 2 3

$'Col Parent1'$cols
[1] 2

$'Col Parent2'
$'Col Parent2'$rows
[1] 4 5 6

$'Col Parent2'$cols
[1] 2

> plist
$rows
[1] 1 2 3

```

```

$cols
[1] 2

> res
Col Child1 Col Child2 Col Child3
      1         2         3

> plist
$rows
[1] 4 5 6

$cols
[1] 2

> res
Col Child1 Col Child2 Col Child4
      4         5         6

> plist
Col Child1 Col Child2 Col Child3
      1         2         3

> matData
      V2  V3  V4  V5  V6  V7
[1,] "10" "20" "30" "50" "60" "80"
[2,] "11" "21" "31" "51" "61" "81"
[3,] "12" "22" "32" "52" "62" "82"
[4,] "13" "23" "33" "53" "63" "83"

> datbit
      V2  V3  V4
[1,] "10" "20" "30"
[2,] "11" "21" "31"
[3,] "12" "22" "32"
[4,] "13" "23" "33"

> plist
Col Child1 Col Child2 Col Child4
      4         5         6

> matData
      V2  V3  V4  V5  V6  V7
[1,] "10" "20" "30" "50" "60" "80"
[2,] "11" "21" "31" "51" "61" "81"
[3,] "12" "22" "32" "52" "62" "82"
[4,] "13" "23" "33" "53" "63" "83"

> datbit
      V5  V6  V7
[1,] "50" "60" "80"
[2,] "51" "61" "81"
[3,] "52" "62" "82"
[4,] "53" "63" "83"

> colplist
$'Col Parent1'
+ Col Child1 (1, 2)
+ Col Child2 (2, 2)
+ Col Child3 (3, 2)

$'Col Parent2'
+ Col Child1 (4, 2)
+ Col Child2 (5, 2)
+ Col Child4 (6, 2)

```



```

> res
      UNKNOWN UNKNOWN Col Child1 Col Child2 Col Child3 Col Child4
1 Col Parent1 Row 1      10      20      30      NA
2 Col Parent1 Row 2      11      21      31      NA
3 Col Parent1 Row 3      12      22      32      NA
4 Col Parent1 Row 4      13      23      33      NA
5 Col Parent2 Row 1      50      60      NA      80
6 Col Parent2 Row 2      51      61      NA      81

```

8.15 ToyExMisalignedColumnLabel.csv

	1	2	3	4	5	6	7	8	9
1			Col Parent1				Col Parent2		
2		Col Child1	Col Child2	Col Child3	Col Child4	Col Child1	Col Child2	Col Child3	Col Child4
3	Row 1	10	20	30	40	50	60	70	80
4	Row 2	11	21	31	41	51	61	71	81
5	Row 3	12	22	32	42	52	62	72	82
6	Row 4	13	23	33	43	53	63	73	83

```

> rowData
[1] 3 6
> colData
[1] 2 9
> rowslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> colslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7 8 9

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowplist
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] NA      "Col Parent1" NA      NA      NA
[2,] "Col Child1" "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] "Col Parent2"
[2,] "Col Child2"
> cursub
      V2      V3      V4      V5
      NA "Col Parent1"      NA      NA
> currow[curcols]

```

```

      V2      V3      V4      V5
"Col Parent1"      NA      NA      NA
> cursub
      V6      V7      V8      V9
NA "Col Parent2"      NA      NA
> currow[curcols]
      V6      V7      V8      V9
"Col Parent2"      NA      NA      NA
> cursub
      V2      V3      V4      V5
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> currow[curcols]
      V2      V3      V4      V5
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> cursub
      V6      V7      V8      V9
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> currow[curcols]
      V6      V7      V8      V9
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      NA      "Col Parent2"
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] "Col Child2"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      NA      "Col Parent2"
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] "Col Child2"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Parent1" NA      NA      NA      "Col Parent2"
[2,] "Col Child1"  "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] "Col Child2"
> res
$'Col Parent1'
$'Col Parent1'$rows
[1] 1 2 3 4

$'Col Parent1'$cols
[1] 2

$'Col Parent2'
$'Col Parent2'$rows
[1] 5 6 7 8

$'Col Parent2'$cols
[1] 2

```

```

> plist
$rows
[1] 1 2 3 4

$cols
[1] 2

> res
Col Child1 Col Child2 Col Child3 Col Child4
      1         2         3         4
> plist
$rows
[1] 5 6 7 8

$cols
[1] 2

> res
Col Child1 Col Child2 Col Child3 Col Child4
      5         6         7         8
> plist
Col Child1 Col Child2 Col Child3 Col Child4
      1         2         3         4
> matData
      V2  V3  V4  V5  V6  V7
[1,] "10" "20" "30" "40" "50" "60"
[2,] "11" "21" "31" "41" "51" "61"
[3,] "12" "22" "32" "42" "52" "62"
[4,] "13" "23" "33" "43" "53" "63"
> datbit
      V2  V3  V4  V5
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> plist
Col Child1 Col Child2 Col Child3 Col Child4
      5         6         7         8
> matData
      V2  V3  V4  V5  V6  V7
[1,] "10" "20" "30" "40" "50" "60"
[2,] "11" "21" "31" "41" "51" "61"
[3,] "12" "22" "32" "42" "52" "62"
[4,] "13" "23" "33" "43" "53" "63"
> datbit
      V6  V7  V8  V9
[1,] "50" "60" "70" "80"
[2,] "51" "61" "71" "81"
[3,] "52" "62" "72" "82"
[4,] "53" "63" "73" "83"
> colplist
$'Col Parent1'
+ Col Child1 (1, 2)
+ Col Child2 (2, 2)
+ Col Child3 (3, 2)
+ Col Child4 (4, 2)

```

```

$'Col Parent2'
+ Col Child1 (5, 2)
+ Col Child2 (6, 2)
+ Col Child3 (7, 2)
+ Col Child4 (8, 2)

> res
      UNKNOWN UNKNOWN Col Child1 Col Child2 Col Child3 Col Child4
1 Col Parent1  Row 1      10      20      30      40
2 Col Parent1  Row 2      11      21      31      41
3 Col Parent1  Row 3      12      22      32      42
4 Col Parent1  Row 4      13      23      33      43
5 Col Parent2  Row 1      50      60      70      80
6 Col Parent2  Row 2      51      61      71      81

```

8.16 ToyExMisalignedColumnLabel2.csv

	1	2	3	4	5	6	7	8	9
1				Col Super-Parent					
2			Col Parent1				Col Parent2		
3		Col Child1	Col Child2	Col Child3	Col Child4	Col Child1	Col Child2	Col Child3	Col Child4
4	Row 1	10	20	30	40	50	60	70	80
5	Row 2	11	21	31	41	51	61	71	81
6	Row 3	12	22	32	42	52	62	72	82
7	Row 4	13	23	33	43	53	63	73	83

```

> rowData
[1] 4 7
> colData
[1] 2 9
> rowslist
$label
[1] 1 2 3

$data
[1] 4 5 6 7

> colslist
$label
[1] 1

$data
[1] 2 3 4 5 6 7 8 9

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowplist
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] NA      NA      "Col Super-Parent" NA      NA
[2,] NA      "Col Parent1" NA      NA      NA
[3,] "Col Child1" "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] "Col Parent2"
[3,] "Col Child2"
> cursub

```

```

      V2      V3      V4      V5
      NA      NA "Col Super-Parent"      NA
      V6      V7
      NA      NA
> currow[curcols]
      V2      V3      V4      V5
"Col Super-Parent"      NA      NA      NA
      V6      V7
      NA      NA
> cursub
      V2      V3      V4      V5
      NA "Col Parent1"      NA      NA
> currow[curcols]
      V2      V3      V4      V5
"Col Parent1"      NA      NA      NA
> cursub
      V6      V7      V8      V9
      NA "Col Parent2"      NA      NA
> currow[curcols]
      V6      V7      V8      V9
"Col Parent2"      NA      NA      NA
> cursub
      V2      V3      V4      V5
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> currow[curcols]
      V2      V3      V4      V5
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> cursub
      V6      V7      V8      V9
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> currow[curcols]
      V6      V7      V8      V9
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Super-Parent" NA      NA      NA      NA
[2,] "Col Parent1"      NA      NA      NA      "Col Parent2"
[3,] "Col Child1"      "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] NA
[3,] "Col Child2"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Super-Parent" NA      NA      NA      NA
[2,] "Col Parent1"      NA      NA      NA      "Col Parent2"
[3,] "Col Child1"      "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7
[1,] NA
[2,] NA
[3,] "Col Child2"
> matColLabel
      V2      V3      V4      V5      V6
[1,] "Col Super-Parent" NA      NA      NA      NA
[2,] "Col Parent1"      NA      NA      NA      "Col Parent2"
[3,] "Col Child1"      "Col Child2" "Col Child3" "Col Child4" "Col Child1"
      V7

```

```

[1,] NA
[2,] NA
[3,] "Col Child2"
> res
$'Col Super-Parent'
$'Col Super-Parent'$rows
[1] 1 2 3 4 5 6 7 8

$'Col Super-Parent'$cols
[1] 2 3

> res
$'Col Parent1'
$'Col Parent1'$rows
[1] 1 2 3 4

$'Col Parent1'$cols
[1] 3

$'Col Parent2'
$'Col Parent2'$rows
[1] 5 6 7 8

$'Col Parent2'$cols
[1] 3

> plist
$rows
[1] 1 2 3 4

$cols
[1] 3

> res
Col Child1 Col Child2 Col Child3 Col Child4
      1          2          3          4

> plist
$rows
[1] 5 6 7 8

$cols
[1] 3

> res
Col Child1 Col Child2 Col Child3 Col Child4
      5          6          7          8

> plist
Col Child1 Col Child2 Col Child3 Col Child4
      1          2          3          4

> matData
      V2 V3 V4 V5 V6 V7
[1,] "10" "20" "30" "40" "50" "60"
[2,] "11" "21" "31" "41" "51" "61"
[3,] "12" "22" "32" "42" "52" "62"

```



```

[4,] "13" "23" "33" "43" "53" "63"
> datbit
      V2  V3  V4  V5
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> plist
Col Child1 Col Child2 Col Child3 Col Child4
      5          6          7          8
> matData
      V2  V3  V4  V5  V6  V7
[1,] "10" "20" "30" "40" "50" "60"
[2,] "11" "21" "31" "41" "51" "61"
[3,] "12" "22" "32" "42" "52" "62"
[4,] "13" "23" "33" "43" "53" "63"
> datbit
      V6  V7  V8  V9
[1,] "50" "60" "70" "80"
[2,] "51" "61" "71" "81"
[3,] "52" "62" "72" "82"
[4,] "53" "63" "73" "83"
> colplist
$'Col Super-Parent'
+ Col Parent1 (1, 2)
- + Col Child1 (1, 3)
- + Col Child2 (2, 3)
- + Col Child3 (3, 3)
- + Col Child4 (4, 3)
+ Col Parent2 (5, 2)
- + Col Child1 (5, 3)
- + Col Child2 (6, 3)
- + Col Child3 (7, 3)
- + Col Child4 (8, 3)

> res
      UNKNOWN      UNKNOWN UNKNOWN Col Child1 Col Child2 Col Child3
1 Col Super-Parent Col Parent1 Row 1          10          20          30
2 Col Super-Parent Col Parent1 Row 2          11          21          31
3 Col Super-Parent Col Parent1 Row 3          12          22          32
4 Col Super-Parent Col Parent1 Row 4          13          23          33
5 Col Super-Parent Col Parent2 Row 1          50          60          70
6 Col Super-Parent Col Parent2 Row 2          51          61          71
  Col Child4
1          40
2          41
3          42
4          43
5          80
6          81

```

8.17 ToyExMismatchedColumnLabel.csv

	1	2	3	4	5	6	7	8	9
1		Col Child1		Col Child2		Col Child3		Col Child4	
2	Row 1		10		20		30		40
3	Row 2		11		21		31		41
4	Row 3		12		22		32		42
5	Row 4		13		23		33		43

```

> rowData
[1] 2 5
> colData
[1] 3 9
> rowslist
$label
[1] 1

$data
[1] 2 3 4 5

> colslist
$label
[1] 1 2

$data
[1] 3 4 5 6 7 8 9

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowplist
Row 1 Row 2 Row 3 Row 4
    1     2     3     4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V4      V6      V8
[1,] "Col Child1" "Col Child2" "Col Child3" "Col Child4"
> cursub
      V2      V4      V6      V8
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> currow[curcols]
      V2      V4      V6      V8
"Col Child1" "Col Child2" "Col Child3" "Col Child4"
> matColLabel
      V2      V4      V6      V8
[1,] "Col Child1" "Col Child2" "Col Child3" "Col Child4"

```

```

> matColLabel
      V2      V4      V6      V8
[1,] "Col Child1" "Col Child2" "Col Child3" "Col Child4"
> matColLabel
      V2      V4      V6      V8
[1,] "Col Child1" "Col Child2" "Col Child3" "Col Child4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Col Child1 Col Child2 Col Child3 Col Child4
      1      2      3      4
> plist
Col Child1 Col Child2 Col Child3 Col Child4
      1      2      3      4
> matData
      V3  V5  V7  V9
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> datbit
      V3  V5  V7  V9
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> colplist
Col Child1 Col Child2 Col Child3 Col Child4
      1      2      3      4
> res
UNKNOWN Col Child1 Col Child2 Col Child3 Col Child4
1  Row 1      10      20      30      40
2  Row 2      11      21      31      41
3  Row 3      12      22      32      42
4  Row 4      13      23      33      43

```

8.18 ToyExMultiRowColumnLabel.csv

	1	2	3	4	5	6
1		Column	Column	Column	Column	
2		Child1	Child2	Child3	Child4	
3	Row 1	10	20	30	40	
4	Row 2	11	21	31	41	
5	Row 3	12	22	32	42	
6	Row 4	13	23	33	43	

```

> rowData
[1] 3 6
> colData
[1] 2 5
> rowslist
$label
[1] 1 2

$data
[1] 3 4 5 6

> colslist
$label
[1] 1

$data
[1] 2 3 4 5

> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Row 1 Row 2 Row 3 Row 4
   1    2    3    4
> rowplist
Row 1 Row 2 Row 3 Row 4
   1    2    3    4
> rowvecs
[,1]
[1,] "Row 1"
[2,] "Row 2"
[3,] "Row 3"
[4,] "Row 4"
> matColLabel
      V2      V3      V4      V5
[1,] "Column" "Column" "Column" "Column"
[2,] "Child1" "Child2" "Child3" "Child4"
> cursub
      V2
"Column"
> currow[curcols]
      V2

```

```

"Column"
> cursub
  V3
"Column"
> currow[curcols]
  V3
"Column"
> cursub
  V4
"Column"
> currow[curcols]
  V4
"Column"
> cursub
  V5
"Column"
> currow[curcols]
  V5
"Column"
> cursub
  V2      V3      V4      V5
"Child1" "Child2" "Child3" "Child4"
> currow[curcols]
  V2      V3      V4      V5
"Child1" "Child2" "Child3" "Child4"
> matColLabel
  V2      V3      V4      V5
[1,] "Column" "Column" "Column" "Column"
[2,] "Child1" "Child2" "Child3" "Child4"
> matColLabel
  V2      V3      V4      V5
[1,] "Column" "Column" "Column" "Column"
[2,] "Child1" "Child2" "Child3" "Child4"
> matColLabel
  V2      V3      V4      V5
[1,] "Column Child1" "Column Child2" "Column Child3" "Column Child4"
> plist
$rows
[1] 1 2 3 4

$cols
[1] 1

> res
Column Child1 Column Child2 Column Child3 Column Child4
      1          2          3          4
> plist
Column Child1 Column Child2 Column Child3 Column Child4
      1          2          3          4
> matData
  V2  V3  V4  V5
[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> datbit
  V2  V3  V4  V5

```

```

[1,] "10" "20" "30" "40"
[2,] "11" "21" "31" "41"
[3,] "12" "22" "32" "42"
[4,] "13" "23" "33" "43"
> colplist
Column Child1 Column Child2 Column Child3 Column Child4
      1          2          3          4
> res
UNKNOWN Column Child1 Column Child2 Column Child3 Column Child4
1  Row 1          10          20          30          40
2  Row 2          11          21          31          41
3  Row 3          12          22          32          42
4  Row 4          13          23          33          43

```