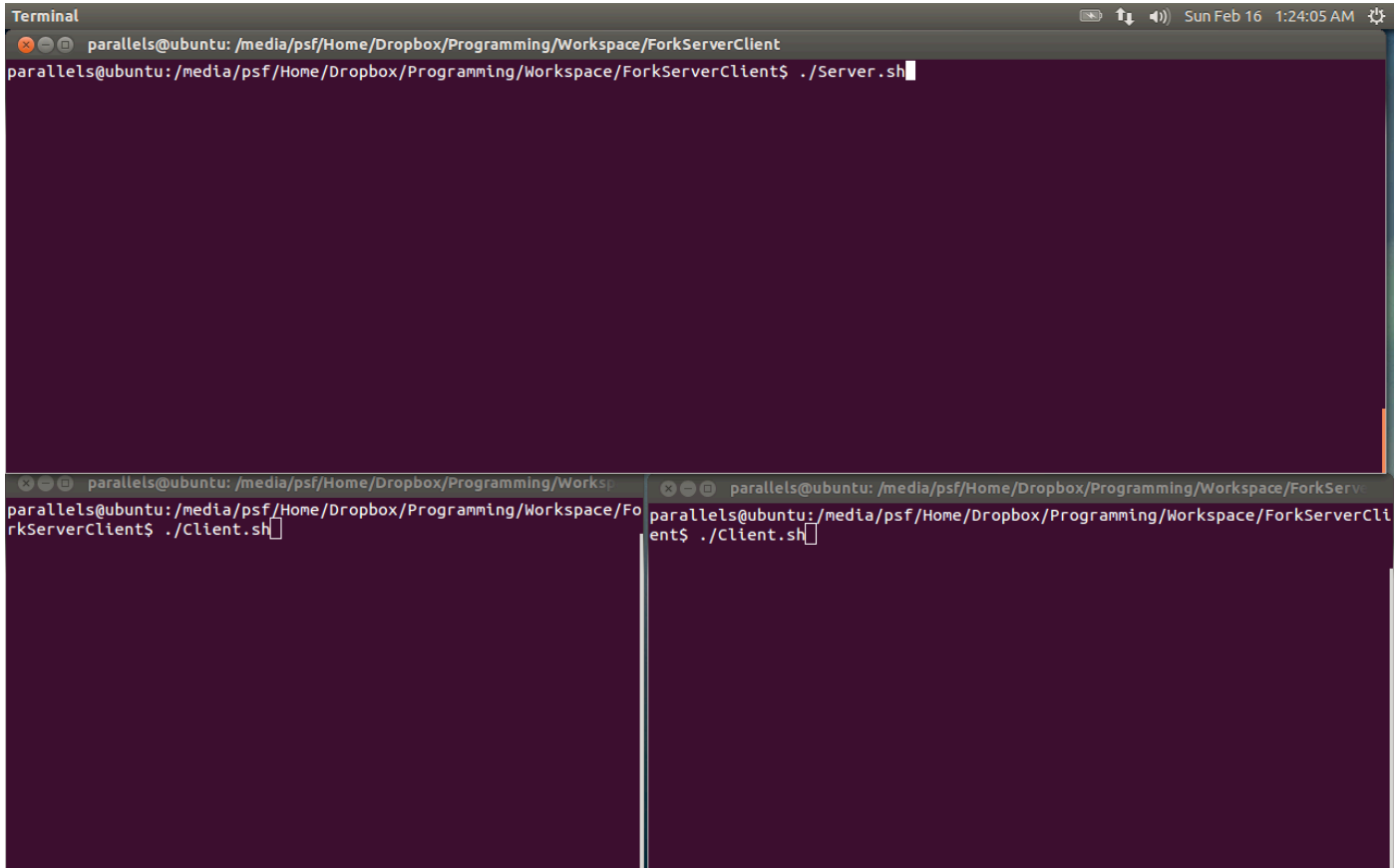


(Interpreted) requirements of the program

- Create a server program that reads data
- Server forks out a child process upon accepting connection request from a client program
- Create client program that prompts user input
- If user input not found in server, error shown
- Else data found in server is shown

Diagram / Illustrations of program design

Main features



The screenshot shows a terminal window with the following content:

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$ ./Server.sh

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$ ./Client.sh
```

The terminal window is titled "Terminal" and shows the user "parallels" at the prompt "parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient". The user has executed the command `./Server.sh` and then `./Client.sh`. The output of the scripts is not visible in the screenshot.

- Before starting up of programs, which are initiated by shell script files

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient

Server has started with PID 2926
Press 'control + c' to terminate

Sun Feb 16 01:24:09 2014
Server : Waiting for a connection
█

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
parallels@ubuntu:/media/psf/Home/Dropbox/Programming/Workspace/Fo
rkServerClient$ ./Client.sh█

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspac
parallels@ubuntu:/media/psf/Home/Dropbox/Programming/Workspace/ForkServ
ent$ ./Client.sh█
```

➤ Server is started

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient

Server has started with PID 2926
Press 'control + c' to terminate

Sun Feb 16 01:24:09 2014
Server : Waiting for a connection
-----
Sun Feb 16 01:24:09 2014
Server : Received connection from 127.0.0.1
Sun Feb 16 01:24:21 2014
Server : Waiting for a connection
Sun Feb 16 01:24:09 2014
Server : Forked child PID 2935
-----
█

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to
search
2) To end program, type in 'end'

Please enter country >

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspac
parallels@ubuntu:/media/psf/Home/Dropbox/Programming/Workspace/ForkServ
ent$ ./Client.sh█
```

➤ A client program has connected to server

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Waiting for a connection
-----
Sun Feb 16 01:24:09 2014
Server : Received connection from 127.0.0.1
Sun Feb 16 01:24:21 2014
Server : Waiting for a connection
Sun Feb 16 01:24:09 2014
Server : Forked child PID 2935
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 5 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "China" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 70 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "CN,China,CH,CN,CHN,156.00,Beijing,Asia,Yuan Renminbi,CNY,1273111290.00" to Client 2935
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to
   search
2) To end program, type in 'end'

Please enter country > China

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 
```

➤ Client has searched for a valid country data and was sent by the server

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Waiting for a connection
-----
Sun Feb 16 01:24:09 2014
Server : Received connection from 127.0.0.1
Sun Feb 16 01:24:21 2014
Server : Waiting for a connection
Sun Feb 16 01:24:09 2014
Server : Forked child PID 2935
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 5 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "China" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 70 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "CN,China,CH,CN,CHN,156.00,Beijing,Asia,Yuan Renminbi,CNY,1273111290.00" to Client 2935
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
TLD          : CN
Country      : China
FIPS104      : CH
ISO2         : CN
ISO3         : CHN
ISONo       : 156.00
Capital      : Beijing
Region       : Asia
Currency     : Yuan Renminbi
CurrencyCode : CNY
Population   : 1273111290.00

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 
```

➤ Client picked option 3 from the menu, country details are shown

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp ForkServerClient
3) Display country details
4) Return to input country
Please enter choice > 2
Please enter country > Brazil

Current country selected

TLD          : CN
Country      : China
FIPS104      : CH
ISO2         : CN
ISO3         : CHN
ISONo       : 156.00
Capital      : Beijing
Region       : Asia
Currency     : Yuan Renminbi
CurrencyCode : CNY
Population   : 1273111290.00

Second country selected

TLD          : BR
Country      : Brazil
FIPS104      : BR
ISO2         : BR
ISO3         : BRA
ISONo       : 76.00
Capital      : Brasilia
Region       : South America
Currency     : Brazilian Real
CurrencyCode : BRL
Population   : 174468575.00

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > █

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServ
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServ
ent$ ./Client.sh
```

➤ Client has picked option 2, current country data is compared with another chosen country

```
Text Editor
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Work ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 5 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "China" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 70 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "CN,China,CH,CN,CHN,156.00,Beijing,Asia
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 6 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Brazil" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 80 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "BR,Brazil,BR,BR,BRA,76.00,Brasilia,Sou
-----
Population          : 174468575.00

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 1

File exported to China.txt

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > █

China.txt (Home /media/psf/Home/Dropbox/Programming/Workspace/ForkSe
1
2 TLD          : CN
3 Country      : China
4 FIPS104      : CH
5 ISO2         : CN
6 ISO3         : CHN
7 ISONo       : 156.000000
8 Capital      : Beijing
9 Region       : Asia
10 Currency    : Yuan Renminbi
11 CurrencyCode : CNY
12 Population  : 1273111290.000000
13
```

➤ Client has picked option 1 and has exported data to a text file

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Work ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 5 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "China" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 70 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "CN,China,CH,CN,CHN,156.00,Beijing,Asia"
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 6 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Brazil" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 80 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "BR,Brazil,BR,BR,BRA,76.00,Brasilia,Southern"
-----

Current Country Selected - China
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 4

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > 
```

Places: Recent, Home, Desktop, Documents, Downloads, Music, Pictures, Videos, Trash, Devices, Computer, Host, Home

Files: Debug, China.txt, Client, Client.c, Client.h, Client.sh, Countries.txt, CountryData.c, CountryData.h, Server, Server.c, Server.h

China.txt (Home /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient)

```
1
2 TLD : CN
3 Country : China
4 FIPS104 : CH
5 ISO2 : CN
6 ISO3 : CHN
7 ISONo : 156.000000
8 Capital : Beijing
9 Region : Asia
10 Currency : Yuan Renminbi
11 CurrencyCode : CNY
12 Population : 1273111290.000000
13
```

➤ Client picked option 4 and has returned to the country input prompt

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Work ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 6 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Brazil" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 80 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "BR,Brazil,BR,BR,BRA,76.00,Brasilia,Southern"
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 86 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "SG,Singapore,SN,SG,SGP,702.00,Singapore"
-----

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > Singapore

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 
```

Places: Recent, Home, Desktop, Documents, Downloads, Music, Pictures, Videos, Trash, Devices, Computer, Host, Home

Files: Debug, China.txt, Client, Client.c, Client.h, Client.sh, Countries.txt, CountryData.c, CountryData.h, Server, Server.c, Server.h

China.txt (Home /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient)

```
1
2 TLD : CN
3 Country : China
4 FIPS104 : CH
5 ISO2 : CN
6 ISO3 : CHN
7 ISONo : 156.000000
8 Capital : Beijing
9 Region : Asia
10 Currency : Yuan Renminbi
11 CurrencyCode : CNY
12 Population : 1273111290.000000
13
```

➤ Client has input another valid country

The screenshot shows a terminal window on the left and a file explorer on the right. The terminal displays a log of server and client interactions. The client sends the message "Invalid" to the server. The file explorer shows a directory with files like Client.c, Client.h, Client.sh, and CountryData.c.

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Work ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 86 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "SG,Singapore,SN,SG,SGP,702.00,Singapore" to Client 2935
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 7 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "Invalid" to Client 2935
-----
3) Display country details
4) Return to input country
Please enter choice > 4

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > singapore

Error - Country Not Found! ('singapore')

Please enter country >
```

➤ Client went back to menu and input an invalid input

The screenshot shows a terminal window on the left and a file explorer on the right. The terminal displays a log of server and client interactions. The client sends the message "Singapore" to the server. The file explorer shows a directory with files like Client.c, Client.h, Client.sh, and CountryData.c.

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Work ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 7 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "Invalid" to Client 2935
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 86 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "SG,Singapore,SN,SG,SGP,702.00,Singapore" to Client 2935
-----
Please enter country > Singapore

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 1

File exported to Singapore.txt

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice >
```

➤ Client exported newly searched data into another file


```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 9 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Singapore" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 86 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "SG,Singapore,SN,SG,SGP,702.00,Singapore,Southeast Asia,Singapore Dollar,SGD,4300419.00" to Client 2935
-----
-----
Sun Feb 16 01:24:21 2014
Server : Received connection from 127.0.0.1
Sun Feb 16 01:34:45 2014
Server : Waiting for a connection
Sun Feb 16 01:24:21 2014
Server : Forked child PID 3184
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
Please enter country > Singapore

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 1

File exported to Singapore.txt

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 
```

➤ Another client has connected to server

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:21 2014
Server : Received bytes 9 from Client 3184
Sun Feb 16 01:24:21 2014
Server : Received message "Singapore" from Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent bytes 86 to Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent message "SG,Singapore,SN,SG,SGP,702.00,Singapore,Southeast Asia,Singapore Dollar,SGD,4300419.00" to Client 3184
-----
-----
Sun Feb 16 01:24:09 2014
Server : Received bytes 7 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Jamaica" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 101 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "JM,Jamaica,JM,JM,JAM,388.00,Kingston,Central America and the Caribbean,Jamaican dollar,JMD,2665636.00" to Client 2935
-----
-----
TLD : JM
Country : Jamaica
FIPS104 : JM
ISO2 : JM
ISO3 : JAM
ISONo : 388.00
Capital : Kingston
Region : Central America and the Caribbean
Currency : Jamaican dollar
CurrencyCode : JMD
Population : 2665636.00

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 
```

➤ Client has searched a valid country

```

Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received bytes 7 from Client 2935
Sun Feb 16 01:24:09 2014
Server : Received message "Jamaica" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 101 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "JM,Jamaica,JM,JM,JAM,388.00,Kingston,Central America and the Caribbean,Jamaican dollar,JMD,2665636.00" to Client 2935
-----
Sun Feb 16 01:24:21 2014
Server : Received bytes 5 from Client 3184
Sun Feb 16 01:24:21 2014
Server : Received message "china" from Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent bytes 7 to Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent message "Invalid" to Client 3184
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServe

TLD : JM
Country : Jamaica
FIPS104 : JM
ISO2 : JM
ISO3 : JAM
ISONo : 388.00
Capital : Kingston
Region : Central America and the Caribbean
Currency : Jamaican dollar
CurrencyCode : JMD
Population : 2665636.00

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice >

Please enter country > Singapore

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice > 2
Please enter country > china

Error - Country Not Found! ('china')

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice >

```

- New Client has searched invalid data and older client searched for another country (Jamaica)

```

Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Received message "Jamaica" from Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent bytes 101 to Client 2935
Sun Feb 16 01:24:09 2014
Server : Sent message "JM,Jamaica,JM,JM,JAM,388.00,Kingston,Central America and the Caribbean,Jamaican dollar,JMD,2665636.00" to Client 2935
-----
Sun Feb 16 01:24:21 2014
Server : Received bytes 5 from Client 3184
Sun Feb 16 01:24:21 2014
Server : Received message "china" from Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent bytes 7 to Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent message "Invalid" to Client 3184
-----
Sun Feb 16 01:24:21 2014
Server : Client 3184 has terminated
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServe

TLD : JM
Country : Jamaica
FIPS104 : JM
ISO2 : JM
ISO3 : JAM
ISONo : 388.00
Capital : Kingston
Region : Central America and the Caribbean
Currency : Jamaican dollar
CurrencyCode : JMD
Population : 2665636.00

Current Country Selected - Singapore
1) Export to file
2) Compare with another country
3) Display country details
4) Return to input country
Please enter choice >

4) Return to input country
Please enter choice > 4

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > end

*** Thank you for using, have a nice day! ***

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$

```

- New Client has quit. It can be seen in the server the time the client program has terminated


```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Sent message "JM,Jamaica,JM,JM,JAM,388.00,Kingston,Central America and the Caribbean,Jamaican dollar,JMD,2665636.00" to Client 2935
-----
Sun Feb 16 01:24:21 2014
Server : Received bytes 5 from Client 3184
Sun Feb 16 01:24:21 2014
Server : Received message "china" from Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent bytes 7 to Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent message "Invalid" to Client 3184
-----
Sun Feb 16 01:24:21 2014
Server : Client 3184 has terminated
-----
Sun Feb 16 01:24:09 2014
Server : Client 2935 has terminated
-----

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Worksp
Please enter choice > 4

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > end

*** Thank you for using, have a nice day! ***

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServ
4) Return to input country
Please enter choice > 4

+++++
Welcome to the Country Info Directory Service
+++++

Usage:
1) At the '>' prompt, type in the name of the country you wish to search
2) To end program, type in 'end'

Please enter country > end

*** Thank you for using, have a nice day! ***

parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$
```

➤ First client has terminated

```
Terminal
parallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient
Sun Feb 16 01:24:09 2014
Server : Sent message "JM,Jamaica,JM,JM,JAM,388.00,Kingston,Central America and the Caribbean,Jamaican dollar,JMD,2665636.00" to Client 2935
-----
Sun Feb 16 01:24:21 2014
Server : Received bytes 5 from Client 3184
Sun Feb 16 01:24:21 2014
Server : Received message "china" from Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent bytes 7 to Client 3184
Sun Feb 16 01:24:21 2014
Server : Sent message "Invalid" to Client 3184
-----
Sun Feb 16 01:24:21 2014
Server : Client 3184 has terminated
-----
Sun Feb 16 01:24:09 2014
Server : Client 2935 has terminated
-----
^Cparallels@ubuntu: /media/psf/Home/Dropbox/Programming/Workspace/ForkServerClient$
```

➤ Server has been terminated

Summary of implementation of each module in your program

CountryData.h

```
void readData ();
    - Read data from file
char* get_line (char *s, size_t n, FILE *f);
    - Read a single line from file
CountryRecordType createCountryRecord (char* aLine);
    - Creation of country from a single line from the file
void displayRecordContent (CountryRecordType ctryRec);
    - Display a single record
void showAllRecords ();
    - Display all record by using a loop
int findCountryRecord (const char* countryName);
    - Search a record using country name
char* getCapital (const char* countryName);
    - Get a capital of a specific country
char* getCurrencyCode (const char* countryName);
    - Get currency code of a specific country
CountryRecordType getCountryData (const char* countryName);
    - Get a record using a country name
void getCountryDataString(char getString[],const char* countryName);
    - Concatenate all data of a record to a string
```

Server.h

```
int Connect();
    - Connection of server: Included setting up of socket and forking child clients
void* SocketHandler(void*,int);
    - Handles forked out child process
void ProcessReceivedData(char[]);
    - Process data that's received and data to be sent
```

CountryData.h

```
void displayInstructions();
    - Display banner with instructions
int startMessaging();
    - Create a loop for sending and receiving messaged
int Connect();
    - Connection of client to server: Setting up of socket
void getCountry();
    - Display input prompt
int storeData(char[]);
    - Stores data into a record
int sendData();
    - Send data using a socket
int recvData();
    - Expects to receive data from server
void exportData(CountryRecordType);
    - Export data into a file
void displayRecordContent();
    - Display a record data
void displayMenu();
    - Show submenu
void compareCountries();
    - Compare another country data with the selected country
```

Reflections on program development

- Assumptions made
 - CountryData.txt is the name of the file containing data
 - Multi-threading not required
 - Client and server are both ran in the same computer (IP 127.0.0.0 is fixed)
- Difficulties faced
 - Understanding the socket code
- What could have been done better
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- Possible enhancements in future
 - Client can edit data in stored in server
- What have I learnt
 - Socket connection between two application
 - Formatting and string manipulation in C