User Manual

For Mobile Phones and Tablets
(May 2012)

Introduction

This is a coordinate geometry (cogo) program written for most mobile phones and tablets, including the iphone, ipad, ipod touch, blackberry, webos and symbian devices and possibly others. It was written using NSBasic/App Studio development software and contains many similar commands of the Visual Basic programming language. It is patterned after ***QuickCogo,*** the author's desktop version together with the handheld versions, including the recent version for Android devices (a separate software program). This software is "web based" and runs in the device's browser through the internet but can be saved to the home screen and used without an internet connection. The recommended browsers are Safari and Chrome. This program includes many of the same essential cogo solutions contained in ***QuickCogo***, making it a useful tool for surveyors and civil engineers on the go. The application contains 27 separate routines accessible through menu buttons, most of which work with a database stored in "localstorage", a term which will be discussed hereafter. Each record contains a point, north and east coordinates and a descriptor. Elevations are included with some routines but they are not saved in the database. A separate version for the larger screens of the ipad and android tablets is also available. Nevertheless, the iphone size is usable on the other sizes.

Installation

Installation is very simple. I will provide you with a URL for your device's browser. Enter it into the browser's address bar and press 'Go' or however you start applications. Upon connecting with the applicable server, the program will open. You can then save it to your home screen for use without an internet connection. Of course, wifi, must be available initially. Keep in mind that this is a 'web based' application and not one that is loaded onto your device like many other programs or even like my android version called cogo4android.

Getting Started

The program opens with title information. At the bottom of that screen is a button that takes you to a menu of buttons containing the various cogo routines. The menu for the phone size is divided into 2 pages so that the buttons are finger press friendly. As you make calculations, the results are stored in an area that is a part of your browser's cache reserved for the application (see localstorage). Every routine within this application can use the points in localstorage. There is a sample database included within the URL. See import/export for how to access it. NOTE: You may see a "No records stored" message immediately prior to the first screen. This is telling you that the database is clean without any data. You may 'import' the sample database to load points or create your own as described hereafter.

Say you have just opened the application on your browser and want to begin doing some calculations. From the menu of buttons, select 'Preferences' (optional). This screen allows you to choose (1) how many decimals to display for distances and coordinates or (2) to work with bearings or azimuths (bearing is the default) or (3) to set a 'Distance Multiplier' with a default of 1. This multiplier will multiply any distance you enter by the multiplier. It is particularly useful

if you are using other units like rods, chains, ground or grid distances, etc. Simply enter the value of the unit in the distance box and the multiplier will be applied to the calculation. Tap the 'Set preferences button to activate your choices, and then tap 'Menu' to go back to the menu buttons. You may use the sample database and/or select the 'Input Data' button. Enter a point number (I like to start with 1) and its North and East coordinates. The descriptor is optional and will default to "None" if left blank. Press 'Save' and the point is stored. You may enter additional points with this method or begin generating your own points using other routines. If you are satisfied with the defaults, you may skip the preferences. All of the screens have a 'Menu' button to return you to the button menu and a 'Reset' button to clear your data entries. Many also have a 'Clear Display' button to only clear the larger box containing results and retain the data entries. You can always check to verify which points have been stored by selecting the 'ListPoints' button from the menu. You can now select some routine with which to work.

Helpful Information

Run the application from your home screen to see more of the device's display area that may be obscured by the browser. After opening the application on an iphone or ipod touch select the box with an arrow at the bottom of the screen, then select 'add to home screen'. Thereafter, simply choose the icon (lowercase letter ***b***) to open the app. The arrow may be at the top on an ipad or elsewhere on a blackberry. (See 'Import' for further information)

If you have upgraded to ios 5 or above, you may use 1 finger scrolling in the display boxes. Otherwise, use 2 fingers to scroll. Scroll as normal on the blackberry and tap a couple of times in the display area on an android device to activate scrolling.

You should update this app occasionally to get the latest changes. Either enter the url again or tap the small circle indicating a re-load. Your database should not be affected although some users have reported that after opening the 'AppStore' app for any reason, some data loss has occurred. This anomaly is random. See 'Import' for additional information.

You may print results of your calculations by emailing them to yourself and printing from your computer. See "Email Results".

Several of the routines on the phone size version do not have space on the small screen to display results of calculations. Therefore, a second screen is used. It contains a 'Back' button at the top for returning to the previous screen and a small "Clear" button at the top right of the display box. Routines like bearing-distance and angle-distance traverses require going back and forth after each calculation. This goes very quickly and smoothly. Devices with larger screens like the ipad have everything on one page.

Device Keypad

Whenever you touch an entry box, the application is designed to have the keypad use input especially for that entry. For example, if numbers only are the entry requirement, you will not be able to enter anything except numbers, comma, dot, etc. but no alpha characters.. (See Evaluation Version for other considerations). Where punctuation may be necessary as part of the entry, that box is allowed to accept almost anything. Some of the screens contain many entry boxes and the

device keypad may obscure some of them. In that case, click the 'Done' or 'Next' buttons on your device. I used an ipod touch for my testing but iphones and blackberrys should also have that or a similar feature.

Data Entry

The manner of entering bearings, azimuths and angles is as follows:
No decimals in bearings or angles. In bearing-distance traverse and Mapcheck, a bearing of N47°30'E is entered as 14730 or 1473000, where 1 is the quadrant. The program adds additional zeros to make 7 digits. Other quadrants are 2 for SE bearings, 3 for SW bearings and 4 for NW bearings. Quadrants are not used when entering azimuths. If a bearing or azimuth is only a single digit number, that number may not be entered alone. 105 is the same as N5°E whereas 025 is the same as an azimuth of 25°. NOTE: Angles for Angle-Dist Traverse and Radial may be entered with 2, 4, 6 or 7 digits. For example: an angle of 5° would have to be entered as 05 and an angle of 123°14'45" would be entered as 1231445. When in doubt, enter angles as 7 digits. Azimuths are always entered with 3, 5 or 7 digits. An azimuth of 5° would be entered as 005, 47°30' as 04730, and 165° as 165. You must enter 'A' in the applicable box on the Preferences screen to activate it for all of the routines used in that session.
The Reset button will clear data entry lines. Occasionally you will want to add to the display so it is not cleared with Reset. It has its own Clear button.
The Compute button will execute the data entered and display it on the screen.
When a line of point numbers or a range of points are to be entered in a text box (as in the area routine) or other entry boxes they MUST be separated with a dot. Most routines include that instruction.

Cogo Routines

A diagram used for testing is included at the end of this manual. It is a 6 sided figure plus a reverse curve and has the following courses, beginning at the most westerly corner designated as point 1. You may jump ahead to "Brg-Dist Routine" and run this bearing-distance traverse to generate a few points in the file.
1 to 2...N47°30'E 41.00
2 to 3....N75°00'E 42.00
3 to 4....S15°00'E 40.00 to the radius point of a curve
4 to 5....N29°00'E 40.00 to the PT of that curve and point of reverse curve
5 to 6....N29°00'E 54.00 to the radius point of the reverse curve
6 to 7....SOUTH or S00°00'E 54.00 to the PT of the reverse curve.
7 to 8....EAST or N90°00'E 15.00
8 to 9....SOUTH or S00°00'E 70.00
9 to 10....S74°30'30"W 63.50
10 to 1....N53°51'28"W 99.72 to the point of beginning.
Note: The evaluation version will not permit decimals. Use whole numbers only.
If the diagram did not print properly, I suggest you reproduce it by using the above data to make your own sketch.

Explanations for the various routines are done in an approximate alphabetical order.

Angles between lines

This routine calculates the interior, exterior and deflection angles for bearings of intersecting lines. The bearings may be entered with the normal data entry rules, including with point numbers. However, they MUST be entered as though they were going away from their point of intersection. When using point numbers, enter the angle point as the middle number. The results are displayed.

Angle-Distance Traverse

After tapping the Ang-Dist button, a screen will appear with several entry spaces. There are also Compute, Menu and Reset buttons. The meanings are as follows:

Occupy and Sight are where you enter the point numbers for the point at which the instrument is set and the one you are sighting. As you move around the traverse, these points will automatically change with each setup.

Closes pt. is the point upon which you will close when running a closed traverse and alerts the program that the traverse is a closed one. Note: Only enter a point here if it is a closed traverse.

Angle and Distance represent the angle and distance. The angle is right from backsight to foresight (the next point on the traverse) and distance is the distance to the next traverse point.

Desc is the descriptor of the next point. If nothing is entered, it is None

Next is the next point number on the traverse**.** It is automatically incremented by one after each course.

If **Azimuths** are being used, the results will be displayed as azimuths rather than bearings.

If a **vertical angle** is entered, a slope distance is assumed. It will be adjusted during the calculation and displayed as such.

The **Reset** button clears all entries and resets all calculations to 0 prior to a new traverse. The display box is cleared by highlighting the entries and deleting.

The **Compute** button is tapped after entries are made. Results are shown in the display box.

Tap the Menu button to return to the main menu.

If you are running a **Closed** traverse, enter the point to be closed upon in the Close Pt box. This alerts the routine that it is a closed traverse. Enter the points occupied and sighted, the angle and distance, descriptor if applicable and the next point on the traverse. Tap Compute and the results will be shown in the display box including the new bearing, distance and coordinates of the new point. You will note that the point occupied is now the former Next point and the one sighted is the former Occupied point. The Next point will have been incremented by one. After entering the last point on the traverse, enter the word done in place of the angle entry. When you tap Compute, the raw closure information will be displayed . There is no closure routine so if the raw closure is not within the limits of good surveying practice, review the field data you entered. You may have to return to the field for checking.

Area

This is a simple method for calculating the area of a closed figure, with or without curves. The screen has a long box for entering point numbers, a display for area in square feet and acres or square meters and hectares when “2” is placed in the applicable box. The points must exist in localstorage.

How it works: Enter the point numbers separated with a dot. The first and last point numbers must be the same or you do not have a closed figure. Add a 0 (dot zero) after the last entry. Tap Compute and the calculations will be made and the area displayed.

If curves are part of the boundary, you must proceed clockwise and include point numbers for the pc, radius point and the pt (in that order) as a temporary part of the boundary, This routine allows up to 3 curves to be included as part of the boundary. After entering all of the point numbers, including the pc, radius point and pt, as previously described, enter the information for the curves as they appear going around the boundary clockwise, beginning with curve1. For example, if the pc was point 3, the radius point 4, the pt point 5 and the curve was to the right, you would enter 3.4.5.r in the curve1 box. If the curve was left, enter the letter l. Do the same for other curves if applicable. Tap Compute and the calculations will be made.

You may make changes in the point number rotation without reentering the points for additional areas or trial and error calculations. If there are more than 3 curves in the figure, you will have to calculate the area of the segment independently using the curve inverse routine.

Azimuths

The Preferences screen contains an entry box to either select bearings or azimuths. Bearings are the default and you will see the letter B in the box. If you prefer to work with azimuths, change it to the letter A. Then each routine that accepts bearings should also accept azimuths. You must enter an uppercase letter. Then tap the Set Preferences button to activate it, along with the other preferences. Azimuths are entered as follows:
3 digits for degrees, 2 digits for minutes and 2 digits for seconds when entering a 7 digit azimuth. You may also enter them as are bearings. For example, an azimuth of 42° is entered as 042. The program will take care of adding the additional zeros. An azimuth of 42°30’ may be entered as 04230. Inverses between points only displays in bearings. You will have to make the conversion yourself.

Bearing-Distance + Inverse

Bearing-Distance...Enter the points from which and to which the traverse is going, then the bearing or azimuth (if azimuth selected), then the distance and optional descriptor. Tap **Compute** and the coordinate results of the calculation are displayed. The From and To points are automatically incremented after each course. The point protection feature (explained later) will warn if a point you selected has already been used.
Inverse...To find the bearing and distance between 2 known points, simply enter them in the From line separated with a dot. You should reset the screen prior to doing this or the point protect feature may be triggered if there is an entry in the To box. The results will be shown on the same display screen as the bearing-distance traverse. Inverse display in azimuth mode is not available. It only displays in Bearings.

Calculator

A third party online calculator for calculations outside of the application. It is straight forward and very comprehensive. It also has a unit conversion feature. You may copy and paste results

into the application. Scroll down for instructions. After opening, you may save it to your home screen.

Curve Calculations

Enter any 2 known values of a curve and the others will be calculated and displayed.

Curve Inverse

This routine computes the curve data between 2 points on an existing curve. You MUST enter the points, each separated with a dot, so that the curve is CLOCKWISE , enter the pc, pt and radius point. The radius point of the curve is the last point entered. The curve data is then displayed together with the area of the segment. You may have to reverse the curve to make it clockwise.

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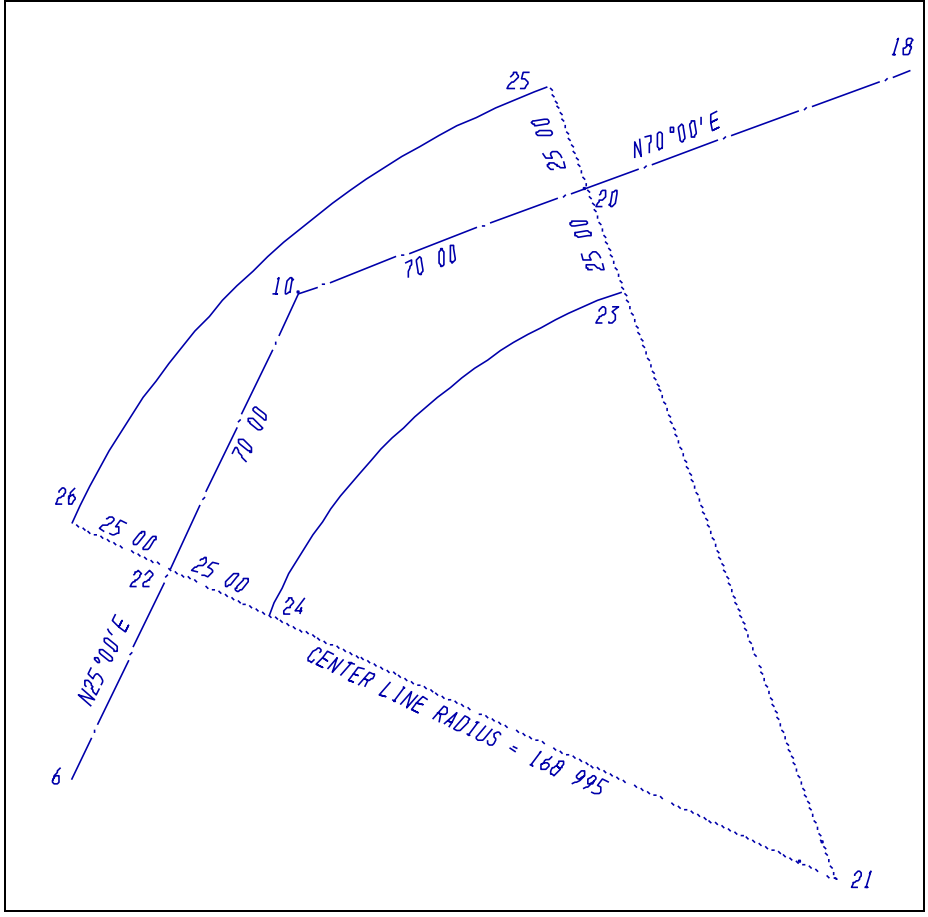
Curves for road alignment (Refer to the figure on the next page)

This routine (Road Curve) computes the right of way curves for a road or street, given the P.I., the bearings ahead and back and either the semi-tangent or centerline radius. It may be used during subdivision calculations when the P.I. of a proposed street has been established and you want to put curves on both sides. Referring to the figure, assume that point 10 is the P.I. from another routine and points 6 and 18 are points on the lines forming the intersection. You want to compute the coordinates and curve information for the right of way curves. The ahead and back bearings are input as are other bearings, except not by point numbers. Either the tangent or the radius can be entered, not both. When you make an entry in one of them, the other is disabled. If you make an entry in the wrong box, unfortunately you will have to start the routine again unless your cursor remains in the entry box and restores the original text. Curve data is displayed for the centerline and for both sides of the right of way. The points calculated are now in storage and assigned as shown in the points box. See the figure on the next page.



3 Points on a Curve

This routine calculates the radius point and the radius of a curve when 3 points along the arc of the curve are known. Enter the 3 points in a clockwise direction, each separated with a dot. Assign a point number for the radius point and tap Compute. The radius will be calculated as well as the coordinates for the radius point and stored in the database. Other curve information may be calculated by inversing between the radius point and a point on the curve or curve inversing between the points.

Databases and Files

A database or a file is a collection of data arranged according to fields of information. In this application the fields are Point, North coordinate, East coordinate and descriptor, each separated with a comma (comma-delimited). Points and their data are stored sequentially in the database in the order in which they are created, whether or not the point numbers are consecutive. You can see how they are stored by viewing localstorage. However, the points are sorted consecutively when listed. New databases must have initial information (at least 1 point) input through the Input routine prior to using the other cogo routines that use points and coordinates. Here is a portion of a file as it will appear in localstorage:

```
2,1027.69920,1030.22837,None
3,1038.56960,1070.79725,None
4,999.93257,1081.15001,None
5,1034.91736,1100.54239,None
6,1082.14682,1126.72211,None
7,1028.14682,1126.72211,None
```

These points happen to be in consecutive order but they would not have to be. Cogo routines in the program search by point number, regardless in which order they are, then select and use their data in the calculation. CAUTION: It is recommended to save points consecutively as much as possible. Large gaps between point numbers may cause problems.

Although you cannot have multiple data files simultaneously, there is a work-around. So long as the 5 MB limit of localstorage is not exceeded, jobs could be assigned according to groups of point numbers. For example, Job A has points 1 through 200, job B points 300-600, and so on. All of the jobs are then available and can interact with each other or be totally independent.

Decimal Places

The **Preferences** screen contains an entry box for entering the number of decimal places for displaying lengths, distances and coordinates. You may enter any number between 0 and 5, both included. The default is 3. You may change the default for your session by entering another number in the box. Or you may revise it for selected routines during the session

Delete Data

This routine allows you to delete selected points within the file or the entire database.
Say you have 25 points in the file but they are not consecutively numbered. Therefore, they were stored as they were entered. View how the points are arranged in Localstorage. Say you want to delete (hide) points 16, 17 and 18 but point 18 was entered after point 20. In the delete points box, enter 16.2. This tells the program you want to start at point 16 and delete it and the next 2 points (the first number being included as the first one) as they appear in localstorage. It will take out 16 and 17. Then enter 18.1 in the box to delete 18. WARNING: This does not permanently delete these points from the database but only for the session. They cannot be accessed but are still in localstorage. They have actually been "hidden" for the current session. In some instances they also are no longer present in localstorage. If you find this to be the case, you can replace the original point with the same number. It is recommended that you experiment to become familiar with what happens when points are deleted. It is also recommended that deletion of points be kept to a minimum.
TIP: Keep your points consecutive as much as possible. The delete procedure deletes the points in the order they are stored in localstorage and not as they are "listed". You may also delete the entire database and start a new one but the data you delete is not recoverable. The name of the database is built into the program and cannot be changed by the user at this time

Distance and Area Conversions

A third party application which converts various units of length and distance to selected units. The Area conversion acts similarly. Instructions are within the application.

Distance Multiplier

This is a multiplier that multiplies every distance used by the value of the multiplier when calculating new coordinates. This value has a default of 1. It can be found on the **Preferences** screen. It is primarily used with the Brg-Dist, Angle-Distance, Radial and Map Check routines. It can be used to convert various length formats like chains, rods, etc. or between grid and ground

distances when using state plane coordinates. In order to activate the multiplier, the **Set Preferences** button must be pressed on the Preferences screen.

Edit Data

There is not a method at this time to edit data for an existing point. Create a new point with the corrected data and tie it somehow to the original point. For example, you want to correct point 37. Input a new point with the number 137 (if available). Unfortunately alpha characters are not allowed to be included with point numbers. (See Delete Data discussion above)

Elevations

Elevations are used in the routines for Grades and Vertical Curves. They are not stored in the database although results of the calculation may be emailed. (See Email Results)

Email Results

There are currently 12 routines, whose display and other entry items may be emailed to yourself or others as a means to print from your computer or to save the results thereof. These are the ones that generally contain non-changing displays and entries. Although the coordinates are always available to view through listing, the procedure for how they were derived is not readily apparent as in the angle-distance traverse. There is not a separate printing routine from the device so emailing what you see on the screen is a viable solution for printing from your computer. Access this feature by selecting the "Email" button on the button menu screen (in red letters at the bottom). On the email form, enter the address to which it will be sent (normally to yourself) and routine you are sending as the subject. Then select the button for the routine at the bottom. It will display the body of the email as the same display from the routine you completed. Then 'Send' and it will be sent to your email address. NOTE: This must be done immediately after completion of the routine so the data results are available.

Evaluation Version

Evaluators are limited to using only whole numbers (no decimals) for entries used in calculations. Entry boxes will not allow decimals in those designed for lengths, distances and coordinates including those devices with external keypads independent of the virtual one. Regardless, evaluators should have no problem understanding how the program works and how it might be useful.

Exit

You may exit the program by selecting another program or link on your device. Data will remain and be shown as you left it when you return.

Geodetic Calculations

These are 2 separate third party applications for making calculations using latitude and longitude in addition to conversions. The results are displayed within the programs. Please read the instructions within the application. Internet is required but you may be able to save them to your home screen even though a message to the contrary could appear.

Grades

This routine calculates the elevations at various stations given the beginning station, its elevation, a slope, an interval between stations, the next station and last station on the slope. Once the slope is determined, random stations may be entered that might not fall within the interval. Stations are entered without the + sign. For example 3+00 is entered as 300. The slope is entered as a percent. If the slope is 5.5%, it is entered as 5.5. You can manipulate the direction of slope and stationing by changing the signs of the slope and interval. Elevations are not stored in the database. .

Import/Export

Some users may want to import an existing database from their work computers. This can be done but not directly. Since the database is integral with the program (part of the URL), importing must be done in a multi-step process. Generally speaking, it may only be necessary for larger databases. You could manually enter points for the smaller ones and even with larger files, you may manually enter the key points and generate the others.

Most desktop cogo software, like ***QuickCogo***, has the ability to create text or ascii files in several formats. The one needed here contains "point number, north coordinate,, east coordinate and descriptor" in that order, separated with commas. A typical text file would look like this and is essentially how the data are stored within the application:
1,1000,1000,descriptor
2,1027.699,1030.228,descriptor
3,1038.570,1070.797,descriptor
etc.

As mentioned previously, importing cannot be done directly by the user so this is how it is done: (To import the sample database, included with the application, simply go to step 6.)
To import: (1) create the aforementioned text file on your computer (2) attach the text file to an email and send to me (3) optionally back up the file you are now using on your device (see 'export' below) (4) upon receipt of your email, I will convert the text file into a format recognized by 'localstorage' and insert that file into the program's manifest (5) I will then notify you to re-load the URL sent previously (on your device) or I will send a new one) (6) select "import" at the bottom of the button menu and it will clear localstorage and replace it with the new database . If you are in a hurry please call so I can be looking for your text file. I seldom am away from my computer longer than a couple of hours but will accommodate your schedule. I repeat that this procedure is ONLY necessary if you want to have an existing file from your computer put on your device. In most cases, you will simply generate your own. This is a FREE service. NOTE: I have found that adding at least 1 additional point with data to the imported file makes localstorage more accessible and may prevent loss of data when re-opening the application (see warning below). Any point will do. Usually I save point 99 or 999 for things like this (if not already used) but the coordinates should be within the scope of the project. For instance, use the brgdistinv routine, enter any existing point in the file in 'From', the junk point in 'To', any bearing and a 0 distance to insure that result. This is also a method for duplicating the coordinates of a point. In most cases if you are going to add to the file anyway, you may ignore the above instruction.

WARNING: Unless an additional point with data is added to the imported database, any changes made will be lost when it is re-opened either from the browser or from an icon created when saved to the home screen. The same database may be imported again but it will not have any revisions made. However, if data is input or created for a database, none of the above applies.

EXPORT…You want the database created on the device exported so that you can put it into your computer. The simplest way is to list the points with their data and while they are displayed, go to the menu and select 'Email', then 'List', enter the address to which to send and email it. When received, copy the data and paste it into Notepad. Name and save it as a text file. You now have the same type of text file used for the import. Import that file into your computer's program. I have used it this way with ***QuickCogo*** and it works well.

You can also export or back up the database by selecting the 'export' button at the bottom of the button menu and sending yourself the contents of localstorage. However, the format would have to be massaged on the other end prior to importing into your computer. Backups should be done regularly in case of device or server failure. Unless you clear your browser's cache, your data will remain on the device even after turning everything off. You can check it with the 'ListPoints' routine or view everything in localstorage.

Input

This routine permits you to enter points and their data independently of calculation results. Simply enter a point number and its supporting data. If there is no descriptor, leave it blank and it will default to None. Tap **Save** to store it in the database. The cursor returns for another entry.

Intersections

These routines will calculate the point of intersection for 2 lines with known directions, a line intersecting with a curve and 2 lines with known distances (intersection of 2 curves). Enter only the data you know.

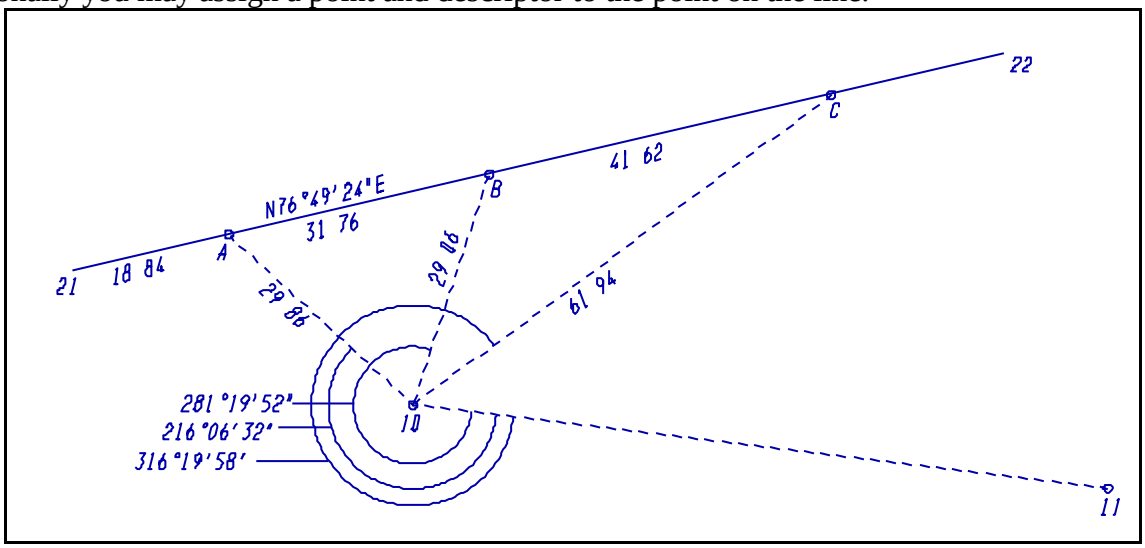
Bearing-bearing intersection... Calculate the unknown distances for the intersection of 2 lines with known bearings. Enter the beginning point, the first bearing, the second bearing, the intersection point, the last point and tap **Compute**. The intersection point will be stored in the database.

Bearing-distance intersection...Same as intersection of a line with a curve, where the radius of the curve is the known distance. Enter the beginning point, a 0 (zero) for the 2nd bearing, the intersection point and the last point. On the next line enter the radius and whether the intersection will be the closest point on the curve (near=1) or the farthest (far=2). The intersection point is calculated and stored in the file. You may find curve information using the curve inverse routine. Bearing to the radius point is found by inverse.

Distance-distance intersection...Same as the intersection of 2 curves with known radii. Enter the beginning, intersection and last points. Then enter the 1st and 2nd distances. If you have entered the points in a clockwise direction, enter cw=1, or in a counter-clockwise direction enter ccw =2) Just enter the numbers, no letters. The intersection point is calculated and stored.
WARNING: Always reset between calculations.

Layout

This routine calculates various points along a known line from a known point. You must also have a point to sight from the known point. The figure on the next page shows how this routine works. Enter the point occupied and the point sighted. Then enter the points for the known line with a start and end. The distance that is entered as the last entry is the length from the start point toward the end point. The display shows the angle right and the distance that would have to be measured to get the unknown point.. As you enter each distance, a new set of angles and distances will appear. The distance you enter is shown to the left of the results of the calculation. Optionally you may assign a point and descriptor to the point on the line.



Line-Line Intersection

This routine is similar to the bearing-bearing intersection solution in the Intersection routines. The exception is that you may enter any 2 lines (that will intersect somewhere) by point numbers and the routine will solve for the coordinate at that intersection and show the distances. You also provide a point number and optional descriptor for the intersection and everything is stored in the database.

Links To Other Sites

Within the application are links to other sites to aid in calculations. The other sites with software contained therein were developed by others and have been included here solely for the convenience of the user. The sites are freely available via the internet. These are the ones included:

Calculator… www.ecalc.com
Triangles (Right)… www.handymath.com/cgi-bin/lineangle6.cgi?submit=Entry
Triangles (Oblique)… www.handymath.com/cgi-bin/irregangle12.cgi?submit=Entry
Geodetic… www.ngs.noaa.gov/TOOLS/spc.html

Geodetic… www.ig.utexas.edu/outreach/googleearth/latlong.html
Conversions… www.convert-me.com/en/convert/length
Conversions… www.convert-me.com/en/convert/area

List

This routine lists the points in your file with their coordinates and descriptors. You may list a range of points separated with a dot or the entire file. Leave the range box blank to list all points. Use the same point number twice to list only 1 point (12.12). Regardless of the order in which they appear in localstorage, they will be listed consecutively when all or a range of points are selected. WARNING: Avoid very high point numbers, if possible. Since the database is sequential, the program goes through the points one at a time. Although in most cases, you won't notice a delay in the display, if you had a very large number of points, especially with high numbers, you may have to wait several seconds before the entire list is displayed.

LocalStorage

This is a built-in area in the browser's cache for placing data. Think of it as a giant "cookie" that will be there until you delete it. This storage is limited to 5 MB which is more than adequate for the data files you will use but can be re-sized if necessary. Localstorage is a text file containing all of the data within the program and from which data are retrieved for use with the cogo routines. It remains until you delete it or clear your browser's cache. Data items are placed in the order in which they are created. For example, if points 1, 34, 3, 8 and 71 are generated, they will appear in that order. The application will sort them for listing while they remain in their original local storage position. When you ask for a point with its data, the program searches localstorage, finds the point and returns the information. The software then uses that data for use in whichever routine you are working. Users may view data by going to the "Delete Data button and selecting 'View localstorage". There is a built-in point protect system to insure against having more than 1 point with the same number. When a new point is created it goes to the end of the list and when retrieved, the program searches the list and picks the first record with the number asked for. If another point had been created with a duplicate number, it would be at the bottom of the pile and never accessed. The point protect provision guards against that happening in most instances (see point protect). Several procedures like curve calculations, vertical curves, grades, map check and coordinate inverse are point independent and don't need to access localstorage.

Map Check

This is a useful routine to check a parcel or figure without the use of coordinates or point numbers. Simply enter each course, including curves, and calculate the closure and area.
Here is an example, again using the diagram to which I have referred previously. Since the figure contains curves, you must proceed in a clockwise direction.

Enter 14730 as the bearing, 41 as the distance and tap **Compute**. Results are displayed.
Enter 175 as the bearing, 42 as the distance and tap **Compute**. Same as before.
You are now at the pc of a curve. Tap the **Curve** button . The label beneath the bearing box will change to 'Brg to rad pt' and the label beneath distance will change to 'Radius'. Enter 215 for the bearing and 40 for the radius and 0440000 for the delta (7 digits only). (These are values which must be known.) NOTE: If the delta angle is not readily available, you may enter the bearing to the PT instead and the delta angle will be calculated and placed in the proper box.

Tap **Compute**.and the results are displayed. The curve information is shown together with the other courses.

You are now at the point of reverse curve so tap the **Curve** button again and proceed as before except now the bearing to the radius point is 129, radius is 54 and the delta is -0290000 (delta must be entered as a 7 digit number).

Since the curve is left, a minus sign is entered prior to the angle. If the delta angle was calculated, enter a 0 (zero) in the small box labeled "L" prior to tapping 'Find Delta' and a "-" will be placed before the delta. Tap **Compute**. Same as before. Enter 190 for the bearing, 15 for the distance. Tap **Compute**.

Enter 200 for the bearing, 70 for the distance. Tap **Compute**

Enter 3743030 for the bearing, 63.5 for the distance. Tap **Compute**. (evaluators must enter whole numbers only)

Enter 4535128 for the bearing and 99.72 for the distance. Tap **Compute**.

You are back to where you began. To get the closure information tap the **Close** button. The closure information will be displayed in a separate box, including the area of the figure.

WARNING: It is always a good idea to **Reset** between calculations in case residual results are present. Evaluators will not be able to enter decimals for distances.

Menus

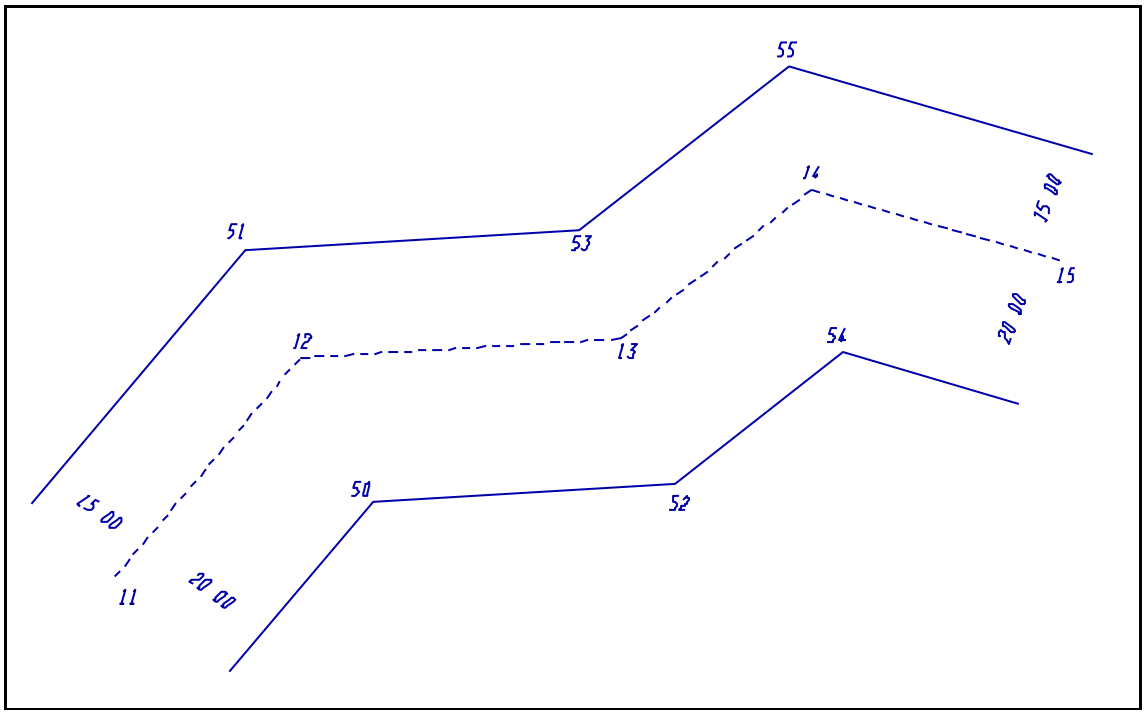
The Menu screen(s) is the one from which the routines are selected. As new routines are added another menu may be designed or the buttons made smaller to increase the available space.

Multiple Inverse

This routine calculates and displays the inverses between multiple points. The points must be in consecutive order from low to high. Enter the first and last points separated with a dot and their inverses will be displayed

Parallel Offsets

This routine calculates the intersection of points along lines parallel with and known distances perpendicular from a reference line defined by a series of P.Is which must already exist in the database. Enter the point numbers for the p.i.s in a clockwise manner separated with a dot. The first point must be a point on the back tangent and the last point be one on the next forward tangent. Enter a 0 (dot zero) after the last point. The point numbers will be assigned as follows: Say there are 3 p.i points as points 12,13 and 14. Now choose a point number outside of the points existing in the database so that none are duplicated. In the example shown on the next page, choose point 50. The first intersection on the right side of point 12 will be 50 and 51 on the left side, 52 on the right side of 13 and 53 on the left side, 54 on the right side of 14, 55 on the left and so on. See figure on next page for a graphic example. You must include points 11 (back tangent) and 15 (forward tangent) when you enter the points to begin



PARALLEL OFFSETS

Perpendicular Offsets

This routine calculates the distance along a line and the perpendicular distance from it to a known point or a range of points. Enter the points occupied, sighted and the target point(s) for which the information is desired. Tap **Compute** and the distance along the sight line and the perpendicular distance, right or left, will be displayed for all the points in the range entered. Separate the target range with a dot. For only 1 point, enter it twice, separated with a dot.

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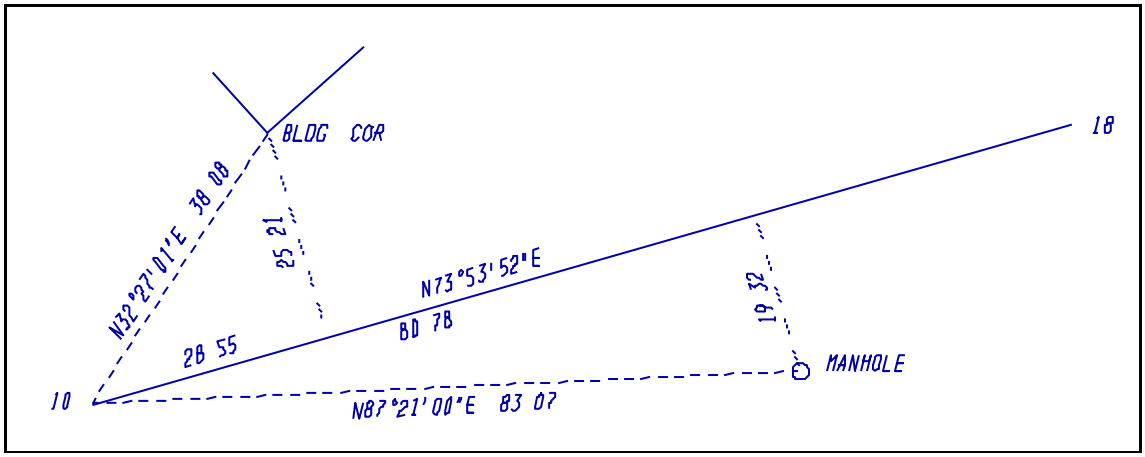

PLOT

This is a simple routine for plotting all or selected points you have generated within your database and drawing lines between them. The main purpose is to see the configuration of the figure you have created with the points. Interaction with the plot is limited but there are several options. Depending upon the size of your device screen, your plot will vary in size. The screen width and height are set when you enter the routine. Enter the points to be plotted, in the order you want the figure to plot, each separated with a dot with a 0 (zero) as the last entry (e.g. 3.5.9.12.45.0). The coordinates for the upper left and lower right limits for the pre-determined plotting area are automatically computed and displayed when the routine is activated. These limits also include a 50 pixel border so that the plots do not crowd the edges. The coordinates of these limits determine the position of the figure on your screen so you may experiment to see how to enlarge or decrease the size of the figure or its position by changing the limits. For example, on an ipod touch the available screen area is 320 x370 after the entry boxes on top are excluded. Say you have a figure to plot with maximum coordinates (excluding points far away from the main figure, as radius points of large radius curves) of 1821 E, 2567 N, and minimum coordinates of 1507 E, 2250 N. An entry for the upper left corner might be 1750 E, 2650 N and 1600 E, 2200 N for the lower right (numbers only without the N or E). This permits the figure from crowding the screen borders. Generally the default limits already displayed will be adequate for most plots. Always enter the East or X coordinate before the North or Y coordinate. The values are separated with a comma. When you are ready to plot, select OK and the figure will be plotted, together with the point numbers at the intersections of the lines. After the plot is complete, you may add to it by resetting the point numbers and entering new ones. Say, for example, the figure plotted between points 3-6-4-12-2-9 and back to 3. Now you want to add a line between 12 and 9 so enter 12.9.0 in the box and select OK again. The additional line will be drawn. Or select "Clear Plot" and rearrange the numbers. It is very flexible since it is the point numbers that determine the shape of the figure. No curves at this time. As previously mentioned, the upper left and lower right coordinates will determine the size and position of the plot on the screen. You may also enter a 'range' of points rather than entering them individually. Enter the range by separating the points with a dot. The range of points will then appear in the longer box and perform the plot. They must be consecutive.

NOTE: The evaluation version already contains the points and limits based upon the figure shown at the end of this manual. They can be changed as desired.

Point Protection

Point protection intends that duplicate points will not be entered into the database. The protection is triggered when you leave an entry box that should have a point number entered. For example: you enter point 20 in the To box for a bearing-distance traverse. If it is already in the database, a message appears telling you that point has already been used and to select another. The original box is cleared and you must enter another point before proceeding. The points cannot be overwritten. There are several routines like Roadcurve, Reverse and Parallel Offsets where several points are created independently of data entry. Although some may be the same as those in your database there is no way to replace them. Only the first entry will trigger an alert if it has been previously used. Insure that you have left enough room in your database so that you do not duplicate existing points. Determine how many new points will be added and plan accordingly.

Printing
See "Email Results" as a way to print results of your calculations.

Radial
This routine calculates points from a known point, sighting another known point. It is similar to the Angle-Distance routine except that the occupied and sighted points remain stationary until you change them. It is similar to obtaining many side shots and is sometimes called Wagon Spoking. It is used to Tie many points from a particular setup and is often used in ALTA surveys. You also can work in azimuth mode so that the results are shown that way. Enter the points occupied and sighted, the angle to the next point, a descriptor if applicable and the next point number being obtained. The points will be automatically incremented as you proceed or you can make changes as desired.

Reverse Offsets
The Reverse offset is the opposite of the perpendicular offset. Instead of computing distances and offsets, the user provides that data and new points are calculated from the reference line. Enter values into the entry boxes. The point on the sight line is a new number that must be assigned. That point and points on the offsets will be calculated and numbered consecutively, the right side before the left. If only one side is needed, leave the other blank. Point protection is only valid for the point on the sight line. Please insure that the other 2 points have not previously been used.

Rotate
This routine allows you to rotate the bearings of all the lines in your database by adding or subtracting an angle. The angle is entered with 3 or 5 digits, then selecting angle Right or Left. The original points will be preserved and new points assigned. The new start point will be protected with the point protection feature but subsequent points will not. Therefore please insure an adequate gap between existing and the new points. Notification of completion will be shown.

Separators
A dot (.) is used to separate entries requiring 2 or more values except for 'coord inverse' and between plot limits. In those cases, a comma is used.

Stakeout
This routine is one in which angles right and distances are calculated to known points from occupied and sighted points. It is very useful in the field for staking out corners from traverse points. Simply enter the points occupied, sighted and a range of target points separated with a dot. The angles right and distances will be displayed. To find only the angle and distance to 1 point, enter it on both sides of the dot (12.12). You also may use azimuths. The results will be displayed relative to north as 0 and not relative to the sight line (the sight line also being an azimuth relative to north). The display shows all points to be staked out from each or multiple

occupied and sighted points.

Translate

This is a routine with which you may change all of the coordinates within the file by a constant amount. The original points will be preserved and new points will be created with the resulting changes. Enter the value to change the North coordinate in the appropriate box and the same for the East coordinate. Precede the number with a minus (-) if subtracting from the coordinate(s). To repeat, this will not change the coordinates of the original database. Select a number from which the new coordinates will begin. Point protection will flag this point if it already exists but will not protect subsequent points. For example, say you have 50 points in your file. You want to add 1000 to the North and 1000 to the East coordinates. The original points were from 1 through 50 so you want to keep the new ones well separated. Enter 101 in the 'Start from' box and select 'Compute'. Points 101 through 151 will be displayed, together with the old point number and now be in your database. Notification of completion will be shown.

Triangle Solutions

Two third party applications, one for right triangles and the other for oblique triangles. Internet is required but you may be able to save them to your home screen even though a message to the contrary may appear.

User Manual

Opens this manual. You may save it to your home screen or read it while online.

Vertical Curves

This routine will calculate the elevations along a vertical curve at designated stations. Stations are entered without a + sign 300 vs 3+00. Enter the PVI (point of vertical intersection), its elevation, the slopes back and ahead in percentages 5.4 = 5.4%, the length of vertical curve, the first target station and an increment between stations. When you tap **Compute** the calculations will be made and displayed, including the BVC, PVI, EVC. You must select whether the curve is a summit or sag one. A summit curve is one in which the elevation of the curve is lower than the PVI at that point and a sag curve is one where the elevation of the curve is higher than the PVI at that point, regardless of any other considerations. Here is an example:
PVI = Station 300, enter 300 on the PVI line
Elevation = 3456.12, enter it on the elevation line.
Grade back = 2.6 (assuming the stationing is going from left to right, the slope is positive
Grade ahead = -1.6 (the slope is negative, forming a summit curve)
Note: If the slope was a positive 1.6, it would still be a summit curve. However, if it were a positive 3.6, it would be a sag curve.
Length of curve = 200. Therefore the BVC is station 200 and the EVC is station 400.
Target = 175, station where elevations will begin but not on the curve yet.
Inc = 25, stations each 25 feet from the target. (DO NOT LEAVE BLANK)
Tap **Compute** and the results will give you the elevations along the curve at 200,225, 250,275,300,325,350,375 and 400.

The figure below is the one used in the mapcheck tutorial. You may want to create a sample file using this diagram as a guide. I normally use 1000 1000 for point 1.
I will continue to try to improve this application**.** All upgrades are free. You may send questions or suggestions to jschuchert@comcast.net or call me at 801-254-7181. Please report any problems as soon as possible so that I may correct them.
www.quickcogo.com.