C−C++ Beautifier HOW−TO

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C−C++ Beautifier HOW−TO

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This document will help you to format (beautify) the C/C++ programs so that it is more readable and confirms to your site C/C++ coding standards. The information in this document applies to all the operating sytems that is − Linux, MS DOS, Apple Macintosh, Windows 95/NT/2000, BeOS, OS/2, IBM OSes, all flavors of Unix like Solaris, HPUX, AIX, SCO, Sinix, BSD, UnixWare, etc.. and to all other operating systems which support "C" compiler (it means almost all the operating systems on this planet!).

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1. Introduction

(The latest version of this document is at http://www.milkywaygalaxy.freeservers.com. You may want to check there for changes).

Coding standards for C/C++ or any language is required in order to make the programs more readable/understandable by programmers. There are C/C++ beautifiers (formating tools) to accomplish this goal. Formatted (beautified) code improves the **productivity** of programmers by **2 times**!!

On Linux/Unixes there is a command called **"indent"** and **"cb"** . Refer to 'man indent' and 'man cb'. Note that **indent** and **cb** work for only "C" programs. For "C++" programs use **"bcpp"**.

Important NOTE: *To compile bcpp under unix, unpack bcpp.tar.gz and you **MUST** change directory to "code" and give a make. Do not change to "unix" directory and give a make. That will give lots of errors.*

Download the beautifier program from one of the following

- If you are having trouble downloading software from any of the sites below, then download from my site at http://www.milkywaygalaxy.freeservers.com

- C++ : BCPP site is at http://dickey.his.com/bcpp/bcpp.html or at http://www.clark.net/pub/dickey. BCPP ftp site is at ftp://dickey.his.com/bcpp/bcpp.tar.gz
- C++ : http://www.consultix−inc.com/c++b.html
- C : http://www.chips.navy.mil/oasys/c/ and mirror at Oasys
- C++ : http://www.semdesigns.com/Products/DMS/DMSToolkit.html
- C++, C, Java and Oracle Pro−C Beautifier http://www.geocities.com/~starkville/main.html
- C++, C beautifier http://users.erols.com/astronaut/vim/ccb−1.07.tar.gz and site at http://users.erols.com/astronaut/vim/#vimlinks_src
- C++, C, Java, Perl beautifier CBP http://www.prismtk.de/docs/cbp
- GC! GreatCode! is a powerful C/C++ source code beautifier Windows 95/98/NT/2000 http://perso.club−internet.fr/cbeaudet
- CbVan for C, C++ and Java at http://www.geocities.com/~starkville/main.html
- Artistic Style beautifier for C, C++, Java at http://sourceforge.net/projects/astyle http://astyle.sourceforge.net.

I used BCPP to format the C++ programs and it worked fine for me. You may want to check other tools and use the one which you may like the most.

BCPP was written by Steven De Toni at

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2. How can I trust Beautifier programs??!!

For 100% assurance you need a **SCIENTIFIC** way to validate and trust a beautifier program. The method described in this section will enable the beautifier program to be accepted as "trust−worthy" and reliable.

In order to verify that beautifier programs like **bcpp**, **indent** or **cb** is not damaging or changing the input source−code after formatting, you can use one of the following technique −

2.1 Method 1: Verfication Program for C++/C

Generate the object code from the original input source code using the compiler −

```
g++ −c myprogram.cpp
```

Here g++ is GNU C++ compiler. This will create object output myprogram.o

Save this file −

```
mv myprogram.o myprogram_orig.o
```

Now run bcpp −

```
bcpp myprogram.cpp
```

This will create the formatted output program file myprogram.cpp and move the original file to myprogram.cpp.orig. Compile the new file with −

```
g++ −c myprogram.cpp
```

Now use the unix 'diff' command to compare the two object files −

```
diff myprogram.o myprogram_orig.o
```

Both these files **MUST BE IDENTICAL**. This verifies that bcpp is working perfectly. On DOS or Windows 95 you may want to use the free Cygnus Cygwin 'diff' or 'MKS' utilities.

If for some reason you are not able to diff the object files then you MUST use the assembly output as described below.

You can use the assembler output instead of object output from the C++ compiler for doing the comparison. Like −

```
g++ −S myprogram.cpp
```

This creates myprogram.s. Verify with −

```
diff myprogram.s myprogram_orig.s
```

This step gives 100% guarantee that your valuable source code is intact and bcpp is JUST doing ONLY formatting and is NOT changing or damaging your code in any way. This method gives you 100% quality assurance and life term or long term **WARRANTY** on beautifier programs like 'bcpp', 'cb' or 'indent'.

It is strongly recommended that you do these two steps every time you run beautifier programs like **bcpp**, **indent** or **cb**.

2.2 Method 2: Verfication Program for Java/C++/Others

Since you cannot compile the Java source code to machine code and you can compile Java source to byte−codes you cannot use the technique given in Method 1 above. When you do diff on Java class files it will always be different.

In this method, a different technique will be given which can be used to validate any beautifier program for Java. Also this method is quite powerful and can be used to validate any beautifier program for any language like C, C++, PERL, SQL, HTML or Java. Since all beautifier program simply rearrange or insert whitespaces , you can strip all the whitespaces from original source file and dump it to a file called verify1.out and strip all the whitespaces from beautified source file and dump it to a file called verify2.out. Now, do a diff on verify1.out and verify2.out. If there is no difference, then beautifier program is working properly. The method is not 100% perfect and can catch atleast 98% of the errors/bugs in the beautifier program. Use this method in conjunction with other methods. But this method is better than not having a verification at all and blindly trusting the beautifier program!!

Note: A whitespace can be one of following – blank space ' ', form−feed '\f', newline '\n', carriage return '\r', horizontal tab '\t' or vertical tab '\v'.

```
bash$ java StripWhitespaces  sample.java > verify1.out
bash$ java StripWhitespaces  sample_beutified.java > verify2.out
bash$ diff verify1.out verify2.out

bash$ java StripWhitespaces  sample.cpp > verify1.out
bash$ java StripWhitespaces  sample_beutified.cpp > verify2.out
bash$ diff verify1.out verify2.out

bash$ java StripWhitespaces  sample.sql > verify1.out
bash$ java StripWhitespaces  sample_beutified.sql > verify2.out
bash$ diff verify1.out verify2.out
```

The source code of StripWhitespaces Java program is not given here. It is left as an exercise for students (you) to write a small program in Java which will simply strip whitespaces from the input text file and output to standard console output. Students are also urged to write this small program (StripWhitespaces) in C, PERL, Unix shell script (Korn, Bourne) and AWK script. Students can see howto the same task can be accomplished in these five different languages and can do comparison of ease of programing. You should ***put a newline '\n' character after every 50 characters*** while generating verify1.out and verify2.out so that when you do a diff you can see on which lines differences are coming up. Otherwise, verify*.out files will just contain one line and it will be difficult to pin−point where exactly the beautifier program is failing (got this point ???).

2.3 Method 3: Shell script: Verfication Program for C++/C

This is a Korn shell script to verify beautifier program. Requires "pdksh*.rpm" from Linux 'contrib' cdrom. Save this file as 'text' file and chmod a+rx on it. You can re−write this shell script in PERL so that you can use it on Window 95/NT or MSDOS. Uncomment the PRGM variable to point to **bcpp**, **cb** or **indent**

```
#!/bin/ksh
```

```
# Verification program to check C++ Beautifiers 'bcpp', 'indent' or cb
############################################################
# Copyright
# The copyright policy is GNU/GPL.
# Author: Al Dev (Alavoor Vasudevan) alavoor[AT]yahoo.com
############################################################

check_beautify_now()
{
        # Remove all the temp files....
        \rm -f ${TMP_FILE}
        \rm -f ${TMP_CPPFILE}*.*

        FNAME=$1
        if [ ! -f ${FNAME} ]; then
                print "\nError: The file ${FNAME} does not exist!!. Aborting now ...."
                exit
        fi
        \cp  -f ${FNAME} ${TMP_CPPFILE}.cpp
        ${COMPILER} -c ${TMP_CPPFILE}.cpp
        if [ ! -f ${TMP_CPPFILE}.o ]; then
                print "Fatal Error: Failed to compile ${FNAME}. Aborting now... "
                exit
        fi
        \mv -f ${TMP_CPPFILE}.o ${TMP_CPPFILE}_orig.o

        aa=`basename $PRGM`
        print "\nRunning, verifying $aa on ${FNAME}"
        ${PRGM} ${TMP_CPPFILE}.cpp
        ${COMPILER} -c ${TMP_CPPFILE}.cpp
        \rm -f $TMP_FILE
        diff ${TMP_CPPFILE}.o ${TMP_CPPFILE}_orig.o 1> $TMP_FILE 2>> $TMP_FILE
        result=""
        result=`wc -c $TMP_FILE | awk '{print $1}' `
        if [ "$result" = "0" ]; then
                print "Success!! Beautifier $aa is working properly!!\n"
        else
                print "Fatal Error: Something wrong!! Beautifier is not working!!"
                exit
        fi
#       ${COMPILER} -S ${TMP_CPPFILE}.cpp
#       diff ${TMP_CPPFILE}.s ${TMP_CPPFILE}_orig.s

        # Remove all the temp files....
        \rm -f ${TMP_FILE}
        \rm -f ${TMP_CPPFILE}*.*
}

########## Main of program begins here ##################3
#PRGM=/usr/bin/bcpp
#PRGM=/usr/bin/cb
PRGM=/usr/bin/indent
COMPILER=/usr/bin/g++

TMP_FILE=beautify.tmp
TMP_CPPFILE=beautify-tmp_cppfile

print -n "Enter the C++ file name <default is *.cpp> : "
read ans
if [ "$ans" = "" -o "$ans" = " " ]; then
        ans="ALL"
else
```

```
        FILENAME=$ans
fi

# Remove all the temp files....
\rm -f ${TMP_FILE}
\rm -f ${TMP_CPPFILE}*.*

if [ "$ans" != "ALL" ]; then
        check_beautify_now ${FILENAME}
else
        ls *.cpp |
        while read FILENAME
        do
                check_beautify_now ${FILENAME}
        done
fi
```

---

3. Beautifiers for other Languages

Visit the following sites to get beautifiers for other languages like HTML, SQL, Java, Perl, Fortran.

- HTML : http://www.digital−mines.com/htb/
- HTML : http://www.datacomm.ch/mwoog/software/perl/beautifier.html
- HTML : http://www.watson−net.com/free/perl/s_fhtml.asp

- SQL : http://www.netbula.com/products/sqlb
- Oracle PLSQL : http://www.revealnet.com

- GPL http://www.geocities.com/~starkville/vancbj.html
- GPL http://kevinkelley.mystarband.net/java/dent.html
- Free http://www.tiobe.com/jacobe.htm
- Free http://www.mmsindia.com/JPretty.html
- Free http://members.magnet.at/johann.langhofer/products/jxbeauty/overview.html (has JBuilder support)
- Free http://www.semdesigns.com/Products/Formatters/JavaFormatter.html
- Commercial $24.99 http://smartbeautify.com
- Commercial $129 http://www.jindent.com
- Google http://directory.google.com/Top/Computers/Programming/Languages/Java/Development_Tools/Code_Beautifiers/?tc=1

- Java, SQL, HTML, C++ : http://www.semdesigns.com/Products/DMS/DMSToolkit.html
- Java JIndent http://home.wtal.de/software−solutions/jindent
- Java Pat http://javaregex.com/cgi−bin/pat/jbeaut.asp
- Java JStyle http://www.redrival.com/greenrd/java/jstyle
- Java JPrettyPrinter http://www.epoch.com.tw/download/ms/java/java.htm
- Java JxBeauty http://members.nextra.at/johann.langhofer/download/jxbeauty and the JxBeauty Home
- Java beautify percolator
- Java list http://www.java.about.com/compute/java/library/weekly/aa102499.htm
- Java html present VasJava2HTML
- Java code colorifier and beautifier http://www.mycgiserver.com/~lisali/jccb

- Perl : http://www.consultix−inc.com/www.consultix−inc.com/talk.htm
- Perl : http://www.consultix−inc.com/www.consultix−inc.com/perl_beautifier.html

- Fortran beautifier : http://www.aeem.iastate.edu/Fortran/tools.html

- C++ : BCPP site is at http://dickey.his.com/bcpp/bcpp.html or at http://www.clark.net/pub/dickey. BCPP ftp site is at ftp://dickey.his.com/bcpp/bcpp.tar.gz
- C++ : http://www.consultix−inc.com/c++b.html
- C : http://www.chips.navy.mil/oasys/c/ and mirror at Oasys
- C++, C, Java, Oracle Pro−C Beautifier http://www.geocities.com/~starkville/main.html
- C++, C beautifier http://users.erols.com/astronaut/vim/ccb−1.07.tar.gz and site at http://users.erols.com/astronaut/vim/#vimlinks_src
- GC! GreatCode! is a powerful C/C++ source code beautifier Windows 95/98/NT/2000 http://perso.club−internet.fr/cbeaudet
- C++ beautifier 'SourceStyler' http://www.ochre.com.au

- White paper on beautifier : http://www.consultix−inc.com/www.consultix−inc.com/talk.htm

To create presentation of codes to display using HTML −

- Presentation (C,C++,Java) to html : http://www.perlstudio.de/cbindex.html

- The GNU project: Srchighlite : http://www.gnu.org/software/src−highlite and its Linux GUI Ksrc2html http://murphy.netsolution−net.de/Ksrc2.html and mirror.

Also search the search engines like http://www.yahoo.com or http://www.lycos.com and search for keyword "beautfier".

4. Related URLs

Visit following locators which are related to C, C++ −

- Vim color text editor for C++, C
- C++ Programming HOWTO
- CVS HOWTO for C++ programs
- Linux goodies http://www.milkywaygalaxy.freeservers.com and mirrors at http://aldev0.webjump.com, angelfire, geocities, virtualave, 50megs, theglobe, NBCi, Terrashare, Fortunecity, Freewebsites, Tripod, Spree, Escalix, Httpcity, Freeservers.

5. Other Formats of this Document

This document is published in 14 different formats namely − DVI, Postscript, Latex, Adobe Acrobat PDF, LyX, GNU−info, HTML, RTF(Rich Text Format), Plain−text, Unix man pages, single HTML file, SGML (Linuxdoc format), SGML (Docbook format), MS WinHelp format.

This howto document is located at −

- http://www.linuxdoc.org and click on HOWTOs and search for howto document name using

CTRL+f or ALT+f within the web−browser.

You can also find this document at the following mirrors sites −

- http://www.caldera.com/LDP/HOWTO
- http://www.linux.ucla.edu/LDP
- http://www.cc.gatech.edu/linux/LDP
- http://www.redhat.com/mirrors/LDP
- Other mirror sites near you (network−address−wise) can be found at http://www.linuxdoc.org/mirrors.html select a site and go to directory /LDP/HOWTO/xxxxx−HOWTO.html

- You can get this HOWTO document as a single file tar ball in HTML, DVI, Postscript or SGML formats from − ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO/other−formats/ and http://www.linuxdoc.org/docs.html#howto

- Plain text format is in: ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO and http://www.linuxdoc.org/docs.html#howto

- Single HTML file format is in: http://www.linuxdoc.org/docs.html#howto

  Single HTML file can be created with command (see man sgml2html) − sgml2html −split 0 xxxxhowto.sgml

- Translations to other languages like French, German, Spanish, Chinese, Japanese are in ftp://www.linuxdoc.org/pub/Linux/docs/HOWTO and http://www.linuxdoc.org/docs.html#howto Any help from you to translate to other languages is welcome.

The document is written using a tool called "SGML−Tools" which can be got from − http://www.sgmltools.org Compiling the source you will get the following commands like

- sgml2html xxxxhowto.sgml (to generate html file)
- sgml2html −split 0 xxxxhowto.sgml (to generate a single page html file)
- sgml2rtf xxxxhowto.sgml (to generate RTF file)
- sgml2latex xxxxhowto.sgml (to generate latex file)

5.1 Acrobat PDF format

PDF file can be generated from postscript file using either acrobat **distill** or **Ghostscript**. And postscript file is generated from DVI which in turn is generated from LaTex file. You can download distill software from http://www.adobe.com. Given below is a sample session:

```
bash$ man sgml2latex
bash$ sgml2latex filename.sgml
bash$ man dvips
bash$ dvips −o filename.ps filename.dvi
bash$ distill filename.ps
bash$ man ghostscript
bash$ man ps2pdf
bash$ ps2pdf input.ps output.pdf
bash$ acroread output.pdf &
```

Or you can use Ghostscript command **ps2pdf**. ps2pdf is a work−alike for nearly all the functionality of Adobe's Acrobat Distiller product: it converts PostScript files to Portable Document Format (PDF) files. **ps2pdf** is implemented as a very small command script (batch file) that invokes Ghostscript, selecting a special "output device" called **pdfwrite**. In order to use ps2pdf, the pdfwrite device must be included in the makefile when Ghostscript was compiled; see the documentation on building Ghostscript for details.

5.2 Convert Linuxdoc to Docbook format

This document is written in linuxdoc SGML format. The Docbook SGML format supercedes the linuxdoc format and has lot more features than linuxdoc. The linuxdoc is very simple and is easy to use. To convert linuxdoc SGML file to Docbook SGML use the program **ld2db.sh** and some perl scripts. The ld2db output is not 100% clean and you need to use the **clean_ld2db.pl** perl script. You may need to manually correct few lines in the document.

- Download ld2db program from http://www.dcs.gla.ac.uk/~rrt/docbook.html or from Milkyway Galaxy site
- Download the cleanup_ld2db.pl perl script from from Milkyway Galaxy

The ld2db.sh is not 100% clean, you will get lots of errors when you run

```
bash$ ld2db.sh file-linuxdoc.sgml db.sgml
bash$ cleanup.pl db.sgml > db_clean.sgml
bash$ gvim db_clean.sgml
bash$ docbook2html db.sgml
```

And you may have to manually edit some of the minor errors after running the perl script. For e.g. you may need to put closing tag < /Para> for each < Listitem>

5.3 Convert to MS WinHelp format

You can convert the SGML howto document to Microsoft Windows Help file, first convert the sgml to html using:

```
bash$ sgml2html xxxxhowto.sgml     (to generate html file)
bash$ sgml2html −split 0   xxxxhowto.sgml (to generate a single page html file)
```

Then use the tool HtmlToHlp. You can also use sgml2rtf and then use the RTF files for generating winhelp files.

5.4 Reading various formats

In order to view the document in dvi format, use the xdvi program. The xdvi program is located in tetex−xdvi*.rpm package in Redhat Linux which can be located through ControlPanel | Applications | Publishing | TeX menu buttons. To read dvi document give the command −

```
xdvi −geometry 80x90 howto.dvi
```

```
man xdvi
```

And resize the window with mouse. To navigate use Arrow keys, Page Up, Page Down keys, also you can use 'f', 'd', 'u', 'c', 'l', 'r', 'p', 'n' letter keys to move up, down, center, next page, previous page etc. To turn off expert menu press 'x'.

You can read postscript file using the program 'gv' (ghostview) or 'ghostscript'. The ghostscript program is in ghostscript*.rpm package and gv program is in gv*.rpm package in Redhat Linux which can be located through ControlPanel | Applications | Graphics menu buttons. The gv program is much more user friendly than ghostscript. Also ghostscript and gv are available on other platforms like OS/2, Windows 95 and NT, you view this document even on those platforms.

- Get ghostscript for Windows 95, OS/2, and for all OSes from http://www.cs.wisc.edu/~ghost

To read postscript document give the command −

```
gv howto.ps
ghostscript howto.ps
```

You can read HTML format document using Netscape Navigator, Microsoft Internet explorer, Redhat Baron Web browser or any of the 10 other web browsers.

You can read the latex, LyX output using LyX a X−Windows front end to latex.

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6. Copyright
