GDB Demonstration Document

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        This Code uses two functions to find the sum and product.

        Sum finds the sum of two numbers.

        Product finds the product of two numbers.

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#include<stdio.h> int sum(int, int);

int product(int, int);

int main() {

        int x,y;         x=5;

        y=20;

        printf("The Sum is %d\n",sum(x,y));

        printf("The Product is %d\n",product(x,y));

         }

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        Function Sum finds the sum of two integers

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int sum(int a , int b)

{

        int s;         s=a+b;         return(s);

}

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        Function Product finds the product of two integers.

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int product(int a, int b)

{

        int p;         p=a\*b;         return(p);

}

**Step 1**: Write down the above code using vi editor.

**Step 2**: Save and Quit.

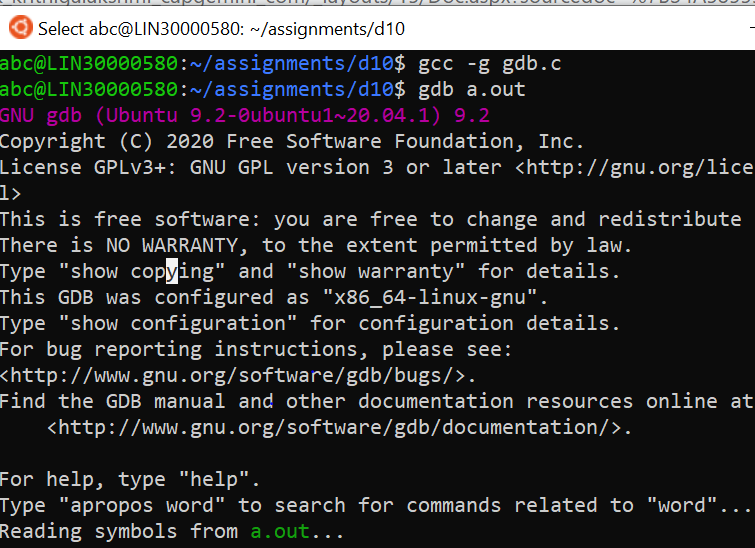
**Step 3**: Compile the code using gcc with the option –g

*gcc  -g filename.c*

( The –g option with gcc, collects the symbol table information which shall be used by gdb)

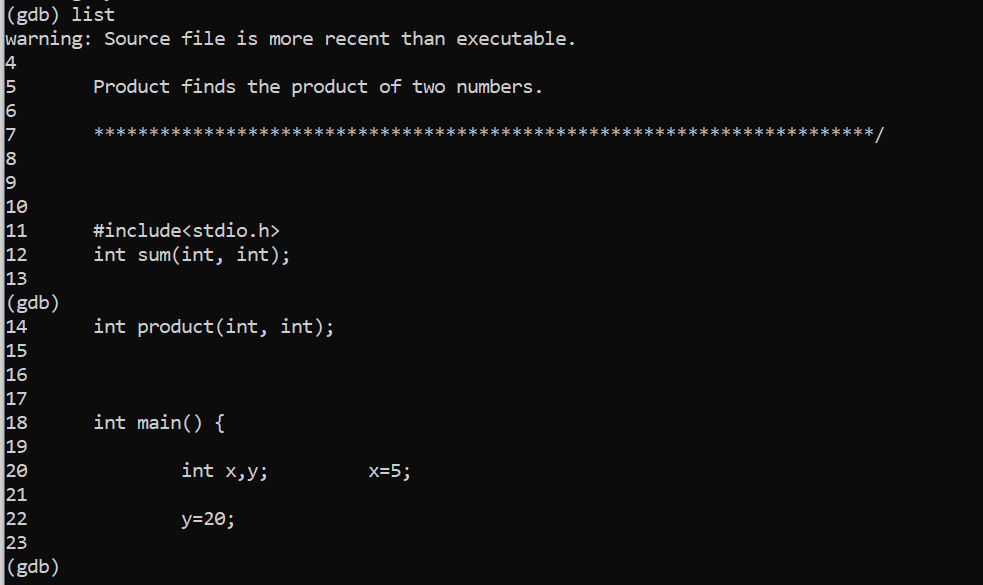
**Step 4**: Execute the executable with gdb

*gdb  a.out*

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**Step 5**: List the code

  (gdb) *list*



What do you observe ?

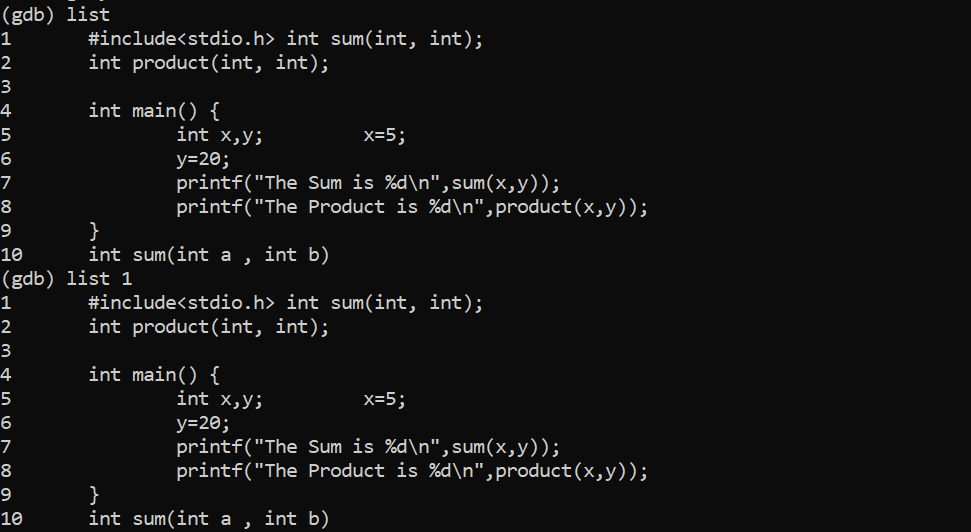
It printed lines from the code.

**Step 6**: If you want to list more than 10 lines, set the list size.

  (gdb)  *set listsize  25*

  (gdb)  *list*

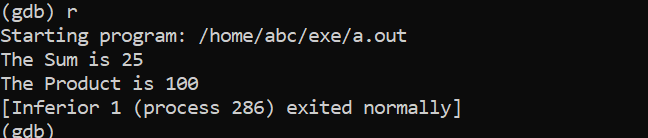
What do you observe? ( Type *list 1* : Observe the output)



* **Now its showing entire code from 0 to line 25.**

**Step 7**: Run the code.

  (gdb)  *r*



What do you observe ?

* Runs the program and display the output.

  Gdb says that the “ *program exited with code 023*”

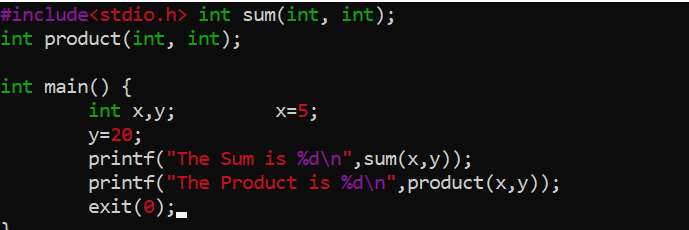
What does this mean ?

* For me its showing process excited normally means it doesn’t find any error and compiled successfully.

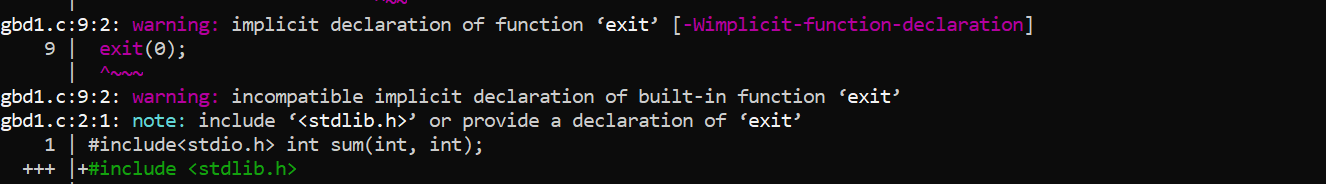
**Step 8**: Quit gdb

  (gdb) *q*

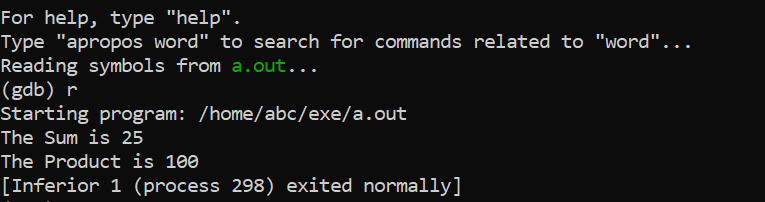
**Step 9**: Edit the code. In the main function, type  *‘exit(0)*’  before the last *‘}’.*

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**Step 10**: Save and exit. Compile the code again with –g option. Invoke the output with gdb.



**Step 11**:Again run the program .



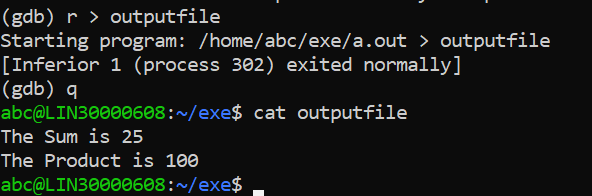
Now what do you observe  ?

* **No change**

**Step 12**: Redirect the output to a file.

  (gdb)    *r  >  outputfile*

**Step 13**: quit gdb. List the contents of outputfile     *cat  outputfile*

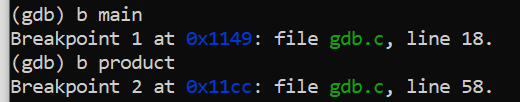


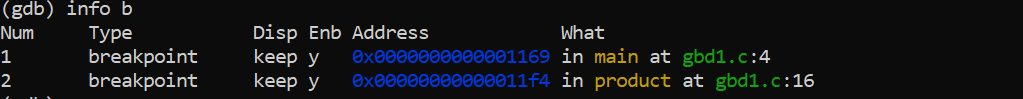
**Step 14**: Again invoke the output with gdb. List  40 lines of the code.

**Step 15**: Set breakpoint. At main, function sum and function product.

  (gdb)  *b  main* (gdb)  *b  23*

  (gdb)   *b  product.*



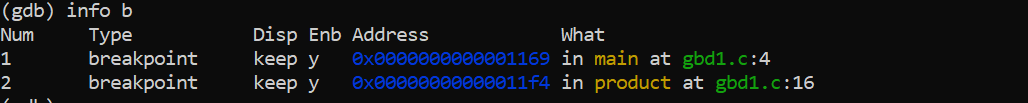


What do you  observe ?

Breakpoints can be assigned using function name as well as line numbers.

**Step 16**: List information about breakpoint.

  (gdb) *info b*



What do you observe ?

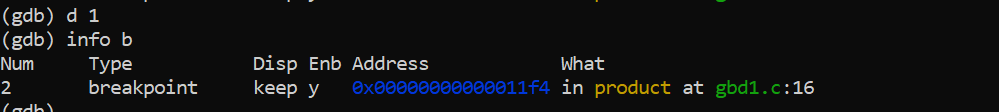
The first column displays the id of each breakpoint.

**Step 17**: Delete breakpoint  with id = 1

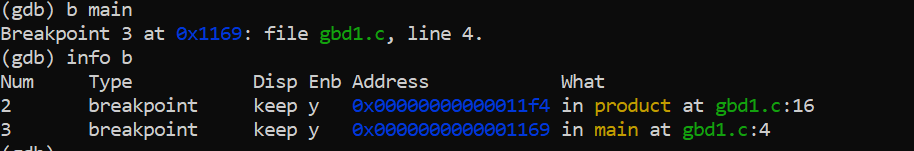
  (gdb)    *d   1*

**Step 18**: Again list information on break points .

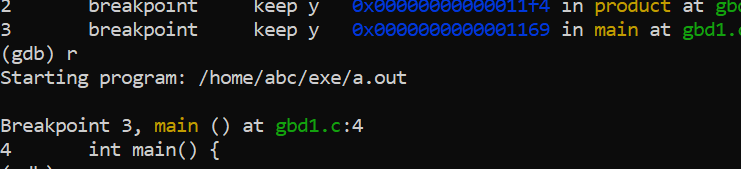
  What do you observe ?



**Step 19**: Again put a break point on main.



**Step 20** : Run the program

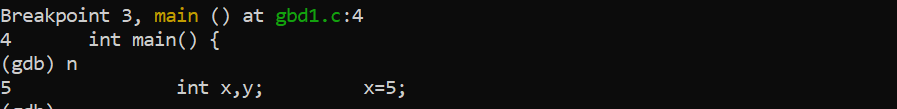


What do you observe  ?

Gdb encounters the first breakpoint and waits for user.

**Step 21**:  To execute this line and go to next line, type the command n (next) and press enter.

  (gdb*)  n*



**Step 22** : Again type n

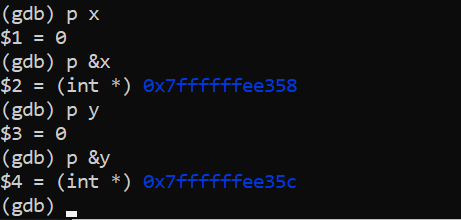
**Step 23**: Fnd out the value of a variable.

  (gdb) *p  x*

**Step 23** :  Find the address of the variable.

  (gdb*)  p  &x*

**Step 24**: Similarly find the value of variable y and address of y



What do you observe ? Can you explain the output ? Can you explain the address of variable x and variable y.

  The command gives the output of the variable and as the variable type is if int it return int \* with the location

**Step 25**: Again execute the next line.

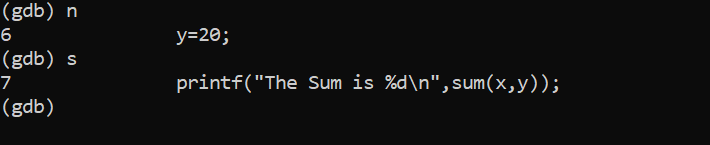
What do you observe ?

Gdb has encountered the second breakpoint.

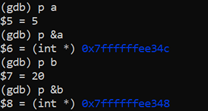
**Step 26:** You may enter the function and execute each line of function one by one.

  (gdb) *s*

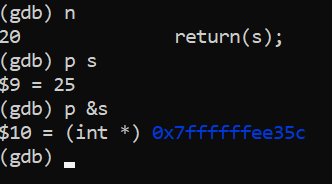
 ( Note the difference between n (next) and s (step). To go inside a function we use the command  s.)



**Step 27** : Find out the value and address of variable a and variable b. What do you  observe ?

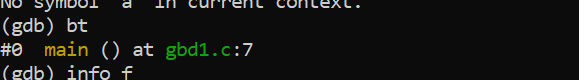


**Step 30** : Execute the next line by typing ‘n’. Find out the value and address of variable s.

**Step 31** : List out the number of active stack frames.

  (gdb) *bt*

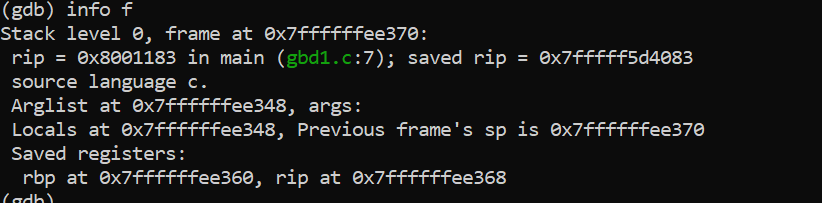


What do you observe ?

Displays current variable that is stored in stack.

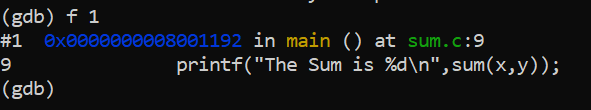
**Step 32** : Get info about current frame.

  (gdb)  *info f*

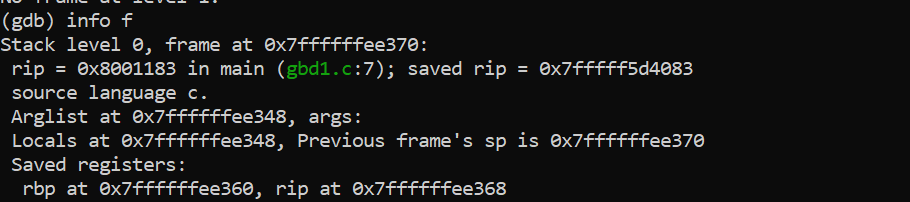


**Step 33**:  Move to previous frame i.e frame number 1

  (gdb*) f 1*

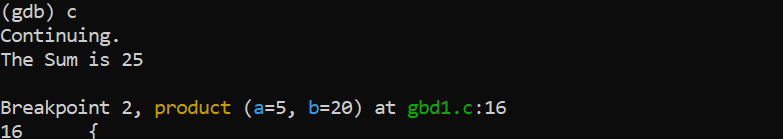
 

**Step 34**: List info about the current stack frame. What do you observe ?

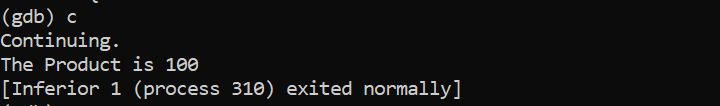


**Step 35**: Continue executing the code until you reach the next   breakpoint .

  (gdb) *c*

  (Command c stands for continue.)

**Step 36** : Again use the command c and press enter



What do you observe ?

* Function of product executed successfully

***TYPE THE FOLLOWING CODE USING VI EDITOR***.

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        This program finds the sum of n natural numbers , where n is         passed as a command line argument..

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#include<stdio.h>

#include<stdlib.h>

int main(int argc, char\* argv[])

{

        int input ,sum, count;

        if (argc < 2)

        {

                printf("Enter the number as a command line arg\n");                 exit(1);

        }

        //We need to convert the argument string to number

        //Call Library Function atoi, which converts the string to number

        input = atoi(argv[1]);         sum = 0;

        for(count=1 ; count <=input ; count++)

        {

                sum = sum + count;

        }

        printf("The sum is %d\n",sum);

        return 0;

}

**Step 1**: Compile the code using gcc  with option –g and invoke gdb (**gdb a.out**)

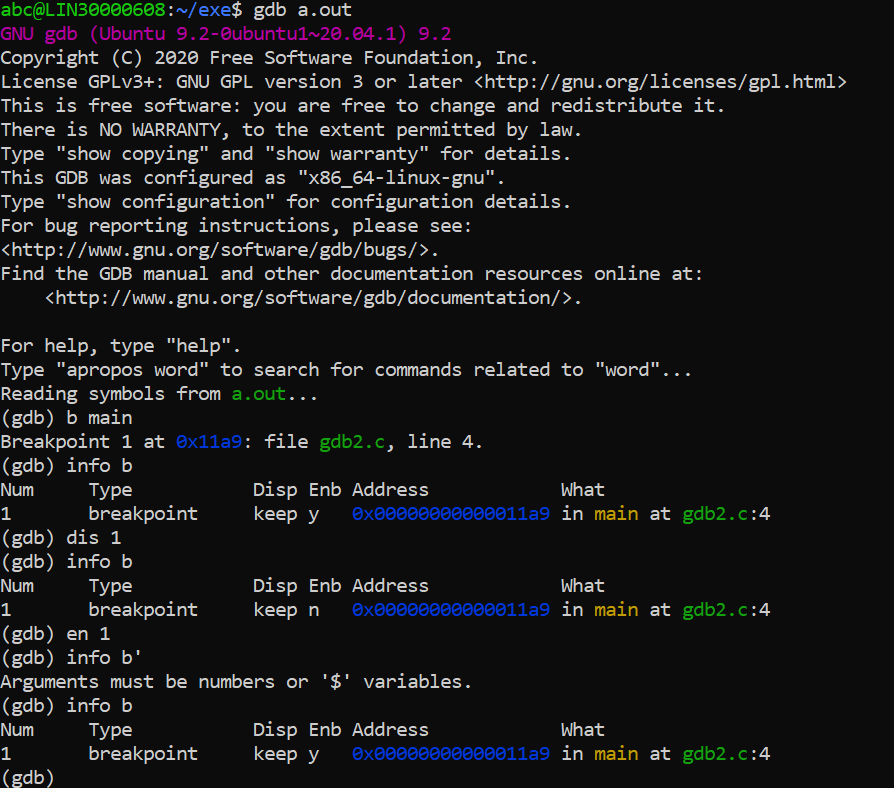
**Step 2**: Assign a breakpoint at main. (**b main**)

**Step 3**:  Breakpoints can be disabled and enabled using the following commands:

(gdb) *dis <id>*

(gdb*) en <id>*

Check the status of the breakpoint after disabling and enabling the breakpoint



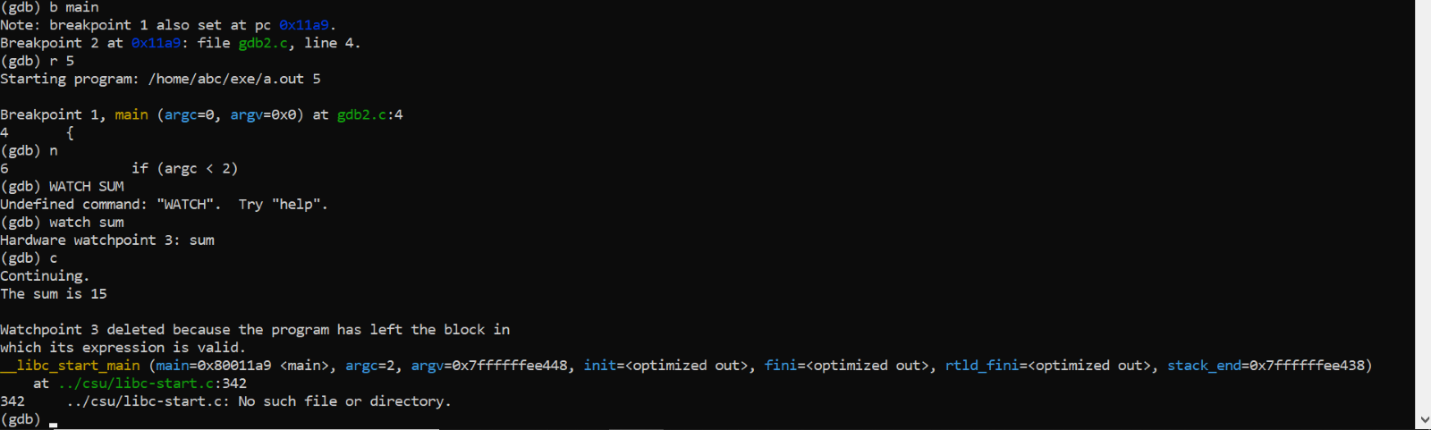
**Step 4**:A watchpoint is a special breakpoint that stops your program when the

  Value of  an expression changes. Let us put a watchpoint on variable sum in main.

 (gdb) *b main*

(gdb*) r  5      ( Here execute the code with command Line Argument  -5)* (gdb) *n*

(gdb) *watch  sum*

(gdb) *c*

What do you observe  ?

* **After you continue the program stops when  the value of the variable sum changes Press Enter to continue or n (next to execute next line of code)**

*Note: When you run the program using command r , you can  provide the command line argument.(Which is 5 in this example)*

***Some more gdb  useful Commands***

To execute a shell command

 gdb> shell <cmd to execute>

To view the contents of a memory location

1. /15c <address>   //display 15 characters

To set a break with condition

    Consider the code below in myfile.c, where to break when i = 4

1. for (i = 0; i < 10; i++)
2. {      22  ret +=i;

               ....

     25  }

   gdb>break myfile.c:21 if (i == 4)

To view the assembly code with source

    gdb> disassem /m