UNIX LAB ASSIGNMENT-WEEK 04

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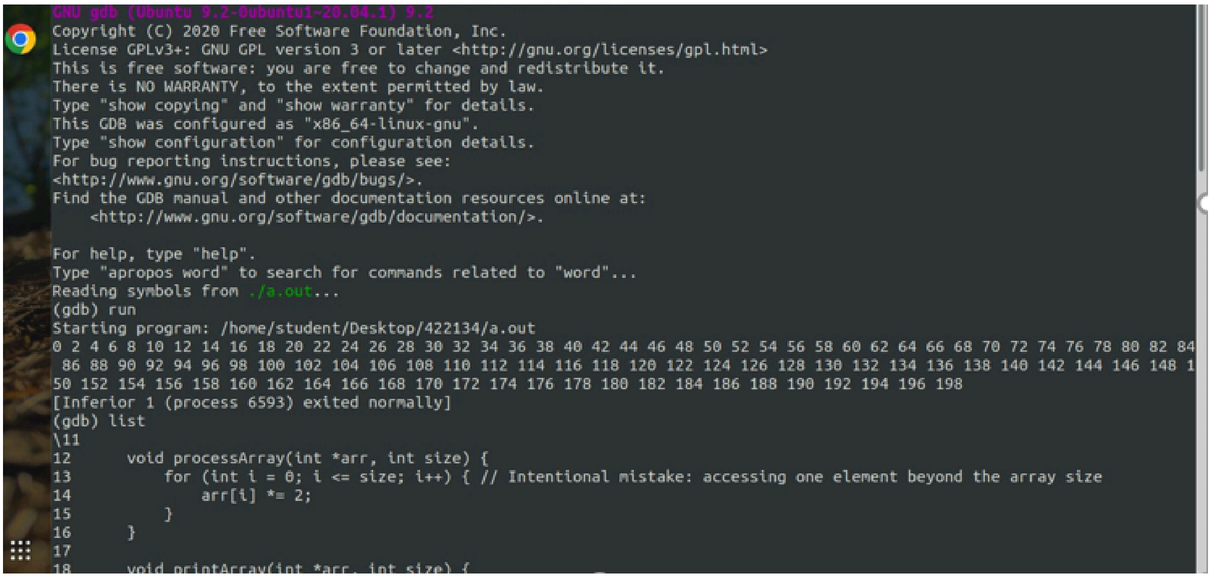
ROLL NO:422147

1)fact.c

```
#include <stdio.h>
#include <stdlib.h>

#define ARRAY_SIZE 100

void initializeArray(int *arr, int size) {
    for (int i = 0; i < size; i++) {
        arr[i] = i;
    }
}

void processArray(int *arr, int size) {
    for (int i = 0; i <= size; i++) { // Intentional mistake: accessing one element beyond the array size
        arr[i] *= 2;
    }
}

void printArray(int *arr, int size) {
    for (int i = 0; i < size; i++) {
        printf("%d ", arr[i]);
    }
    printf("\n");
}

int main() {
    int *arr = (int *)malloc(ARRAY_SIZE * sizeof(int));
    if (arr == NULL) {
        printf("Memory allocation failed!\n");
        return 1;
    }

    initializeArray(arr, ARRAY_SIZE);
    processArray(arr, ARRAY_SIZE);
    printArray(arr, ARRAY_SIZE);
    free(arr);
    return 0;
}
```



```
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
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Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
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For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./a.out...
(gdb) run
Starting program: /home/student/Desktop/422134/a.out
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84
 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134 136 138 140 142 144 146 148 1
50 152 154 156 158 160 162 164 166 168 170 172 174 176 178 180 182 184 186 188 190 192 194 196 198
[Inferior 1 (process 6593) exited normally]
(gdb) list
\11
12      void processArray(int *arr, int size) {
13          for (int i = 0; i <= size; i++) { // Intentional mistake: accessing one element beyond the array size
14              arr[i] *= 2;
15          }
16      }
17
18      void printArray(int *arr, int size) {
```
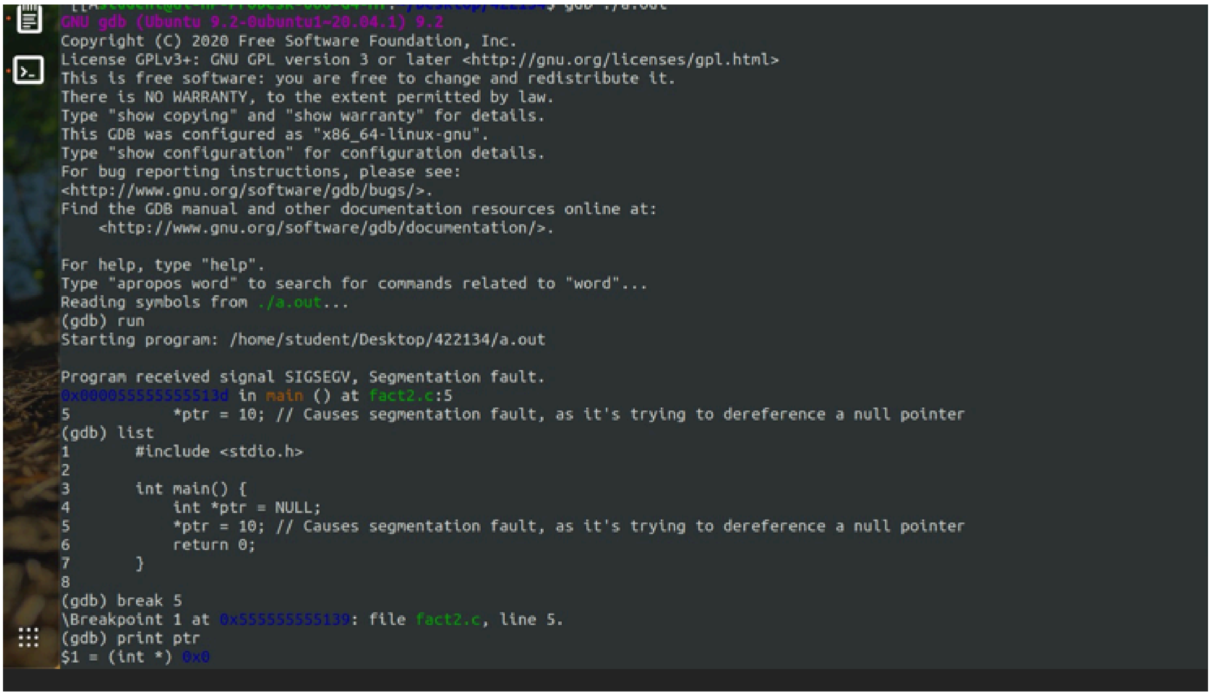

Q2)fact2.c

```
#include <stdio.h>

int main() {
    int *ptr = NULL;
    *ptr = 10; // Causes segmentation fault, as it's trying to dereference a null pointer
    return 0;
}
```



```
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
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For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./a.out...
(gdb) run
Starting program: /home/student/Desktop/422134/a.out

Program received signal SIGSEGV, Segmentation fault.
0x000055555555513d in main () at fact2.c:5
5           *ptr = 10; // Causes segmentation fault, as it's trying to dereference a null pointer
(gdb) list
1       #include <stdio.h>
2
3       int main() {
4           int *ptr = NULL;
5           *ptr = 10; // Causes segmentation fault, as it's trying to dereference a null pointer
6           return 0;
7       }
8
(gdb) break 5
\Breakpoint 1 at 0x555555555139: file fact2.c, line 5.
(gdb) print ptr
$1 = (int *) 0x0
```
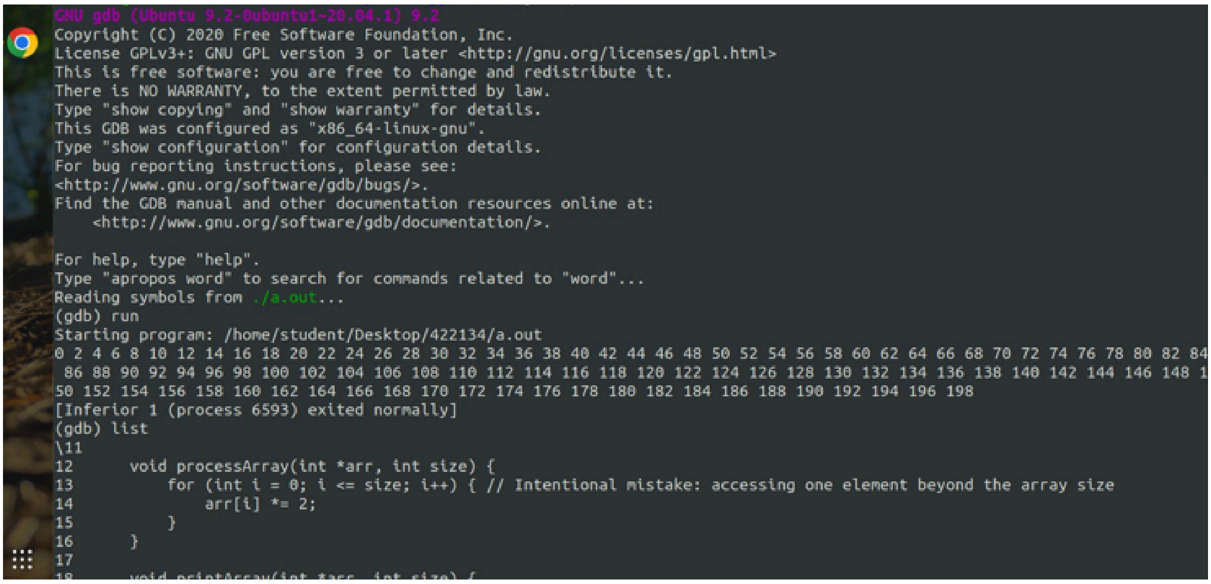

3)fact3.c

```
#include <stdio.h>


int main() {
    int *ptr = NULL;


    // First segmentation fault: Dereferencing a null
pointer
    *ptr = 10;
```

```c
    // Second segmentation fault: Accessing memory beyond the allocated space
    int arr[5];
    arr[10] = 20;

    // Third segmentation fault: Writing to a read-only memory
    char *str = "Segmentation fault";
    str[0] = 's';

    // Fourth segmentation fault: Stack overflow
    main();

    return 0;
}
```



```
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 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134 136 138 140 142 144 146 148 1
50 152 154 156 158 160 162 164 166 168 170 172 174 176 178 180 182 184 186 188 190 192 194 196 198
[Inferior 1 (process 6593) exited normally]
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\11
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16      }
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```