

Ryan Reynolds
2693018
CIS 340

Homework 2

Question 1:

Question 1:

label	address	value
X[0][0][0]	400-403	0
X[0][0][1]	404-407	1
X[0][1][0]	408-411	3
X[0][1][1]	412-415	4
X[0][2][0]	416-419	6
X[0][2][1]	420-423	7
X[1][0][0]	424-427	-1
X[1][0][1]	428-431	2
X[1][1][0]	432-435	0
X[1][1][1]	436-439	3
X[1][2][0]	440-443	
X[1][2][1]	444-447	
i	448-451	0 X 2 3
j	452-455	0 X 2 0 X 2 0 X 2 0 X 2 0 X 2
x	456-459	0 X 2

Question2:

```
ryan@ryan-VirtualBox: ~/Desktop/CIS 340/Homeworks/Reynolds_HW3/Question 2
estion2.out
GNU gdb (Ubuntu 7.11.1-0ubuntu1~16.5) 7.11.1
Copyright (C) 2016 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
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 Question2.out...done.
(gdb) run
Starting program: /home/ryan/Desktop/CIS 340/Homeworks/Reynolds_HW3/Question
uestion2.out
What is your name?RyanReynolds
First Name: Ryan Last Name: Reynolds
Full Name: RyanReynolds
[Inferior 1 (process 3033) exited normally]
(gdb) █
Question2.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW3/Question 2) - gedit
Open ▾ Save
#include <stdio.h>
#include <string.h>
main(){
    char name[50];
    char first[25];
    char last[25];
    printf("What is your name?");
    scanf("%s",name);

    int i;
    int j;
    i=1;
    first[0]=name[0];
    while(name[i]<='z' && name[i]>='a')
    {
        first[i]=name[i];
        i++;
    }
    first[i]=0;
    j=i;
    i=1;
    last[0]=name[j];
    j++;
    while(name[j]<='z' && name[j]>='a')
    {
        last[i]=name[j];
        i++;
        j++;
    }
    last[i]=0;
    printf("First Name: %s Last Name: %s \nFull Name: %s \n", first,
last, name);
}
```

Question 3:

The screenshot shows a terminal window titled "Question3.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 3) - ge". The code is a C program that iterates through command-line arguments to find matches between them. It includes headers for stdio.h and string.h, and defines a main function that loops through all arguments (excluding the first one) and compares them with the subsequent ones. If a match is found, it prints the positions of the matching strings.

```
include <stdio.h>
include <string.h>

int main(int argc, char *argv[]){
    int i,j;
    for(i=0; i<argc-1; i++){
        for(j=i+1; j<argc; j++){
            if(strcmp(argv[i], argv[j])==0)
                printf("Positions %d. %d match: %s"
                       "\n",i,j,argv[i]);
        }
    }
}
```

Ln 12, Col 2

Question 4:

```
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW3/Question 4$ g
db Question4.out
GNU gdb (Ubuntu 7.11.1-0ubuntu1~16.5) 7.11.1
Copyright (C) 2016 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.htm
l>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
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 Question4.out...done.
(gdb) run
Starting program: /home/ryan/Desktop/CIS 340/Homeworks/Reynolds_HW3/Questio
n 4/Question4.out
Enter a String (max 50 chars): stringo%$3
Number of vowels: 2
Number of consonants: 5
Number of digits and special characters: 3[Inferior 1 (process 4369) exited
normally]
(gdb) █
```

Question4.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW3/Question 4) - gedit

Open Save

Question2.c Question4.c

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

main(){
    char word[50], *strP, key;
    int cons, vow, spec;
    printf("Enter a String (max 50 chars): ");
    scanf("%s", word);

    strP=&(word[0]);

    spec=-1; //end character is 0
    for(key=*(strP); key]!='\0';strP++){
        key=*strP;
        if(key=='a' || key=='e' || key=='i' || key=='o' ||
key=='u')
            vow++;
        else if(key<='z' && key>='a')
            cons++;

        else
            spec++;
    }
    printf("Number of vowels: %d\nNumber of consonants: %d \n"
"Number of digits and special characters: %d",vow,cons,spec);
}
```

Question 5:

Question 5%

label	address	value
testd	400-407	7.3
testi	408-411	20123
turtle.x	416-419	400
turtle.y	420-427	3.6 1.5
apple	428-431	416
$tv[0].x$	432-435	448
$tv[0].y$	436-443	
$tv[1].x$	444-447	460
$tv[1].y$	448-455	
$tv[2].x$	456-459	4.36
$tv[2].y$	460-467	6.4

Question6:

The terminal window shows the execution of the program. It starts with help information, then runs the program which asks for matrix dimensions (2x2). It then prompts for 8 values for Matrix A and 4 values for Matrix B. Finally, it performs matrix multiplication and prints the result.

```

ryan@ryan-VirtualBox: ~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 6
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from Question6.out...done.
(gdb) run
Starting program: /home/ryan/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 6/Q
Question6.out
Enter number of rows and cols for the nxn matrices: 2
Enter the value inserted in Matrix A r:0 c:0=4
Enter the value inserted in Matrix A r:0 c:1=3
Enter the value inserted in Matrix A r:1 c:0=2
Enter the value inserted in Matrix A r:1 c:1=1
Enter the value inserted in Matrix B r:0 c:0=4
Enter the value inserted in Matrix B r:0 c:1=3
Enter the value inserted in Matrix B r:1 c:0=2
Enter the value inserted in Matrix B r:1 c:1=1
Matrix Addition:
r0c0: 8      r0c1: 6
r1c0: 4      r1c1: 2

Matrix Multiplication:
r0c0: 16      r0c1: 9
r1c0: 4      r1c1: 1
[Inferior 1 (process 2246) exited normally]
(gdb)

```

The gedit editor shows the source code for Question6.c. The code defines four 2x2 matrices (a, b, c, d) and pointers to their first elements (ap, bp, cp, dp). It uses nested loops to input values for matrices A and B. After input, it performs matrix multiplication by adding corresponding elements from A and B. The result is stored in matrix C.

```

Question6.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 6) - gedit
Open Sav
Question3.c x Question6.c x Question7.c x Question8.c
#include <stdio.h>
#include <string.h>
main(){
    int n, val;
    printf("Enter number of rows and cols for the nxn matrices: ");
    scanf("%d", &n);
    int a[n][n], b[n][n], c[n][n], d[n][n];
    int *ap, *bp, *cp, *dp;
    //populate the matrices goes down each row col by col might need
    //to flip
    ap=&(a[0][0]);
    cp=&(c[0][0]);
    for(int row=0; row<n; row++){
        for(int col=0; col<n; ap+=3, cp+=3, col++){
            printf("Enter the value inserted in Matrix A r:%i
c:%i", row, col);
            scanf("%d", &val);
            *ap=val;
            *cp=val;
        }
    }
    bp=&(b[0][0]);
    cp=&(c[0][0]);
    for(int row=0; row<n; row++){
        for(int col=0; col<n; bp+=3, cp+=3, col++){
            printf("Enter the value inserted in Matrix B r:%i
c:%i", row, col);
            scanf("%d", &val);
            *bp=val;
            *cp+=val;
        }
    }
    //matrix addition: add each element in the corresponding row and
    //col performed during the initialization loops
    printf("Matrix Addition:");
    cp=&(c[0][0]);
    for(int row=0; row<n; row++){

```

```
ha Question6.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 6) - gedit
  Open  Save
Question3.c  Question6.c  Question7.c  Question8.c
/* Question 6: Implement matrix addition and multiplication using pointers.
 * Input: Three matrices A, B, and C, each of size n x n.
 * Output: Matrix D, where D = A + B and D = A * B.
 */
#include <stdio.h>
#include <math.h>

int main() {
    int n;
    printf("Enter the size of the matrices (n): ");
    scanf("%d", &n);

    // Initialize matrices A, B, and C
    int a[n][n];
    int b[n][n];
    int c[n][n];
    int d[n][n];

    // Input matrix A
    printf("Enter matrix A:\n");
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            printf("A[%d][%d]: ", i, j);
            scanf("%d", &a[i][j]);
        }
    }

    // Input matrix B
    printf("Enter matrix B:\n");
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            printf("B[%d][%d]: ", i, j);
            scanf("%d", &b[i][j]);
        }
    }

    // Initialize matrix C
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            c[i][j] = 0;
        }
    }

    // Compute matrix addition: C = A + B
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            c[i][j] = a[i][j] + b[i][j];
        }
    }

    // Print matrix C
    printf("Matrix Addition:\n");
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            printf("%d ", c[i][j]);
        }
        printf("\n");
    }

    // Compute matrix multiplication: D = A * C
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            d[i][j] = 0;
            for (int k=0; k<n; k++) {
                d[i][j] += a[i][k] * c[k][j];
            }
        }
    }

    // Print matrix D
    printf("Matrix Multiplication:\n");
    for (int i=0; i<n; i++) {
        for (int j=0; j<n; j++) {
            printf("%d ", d[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Question 7:

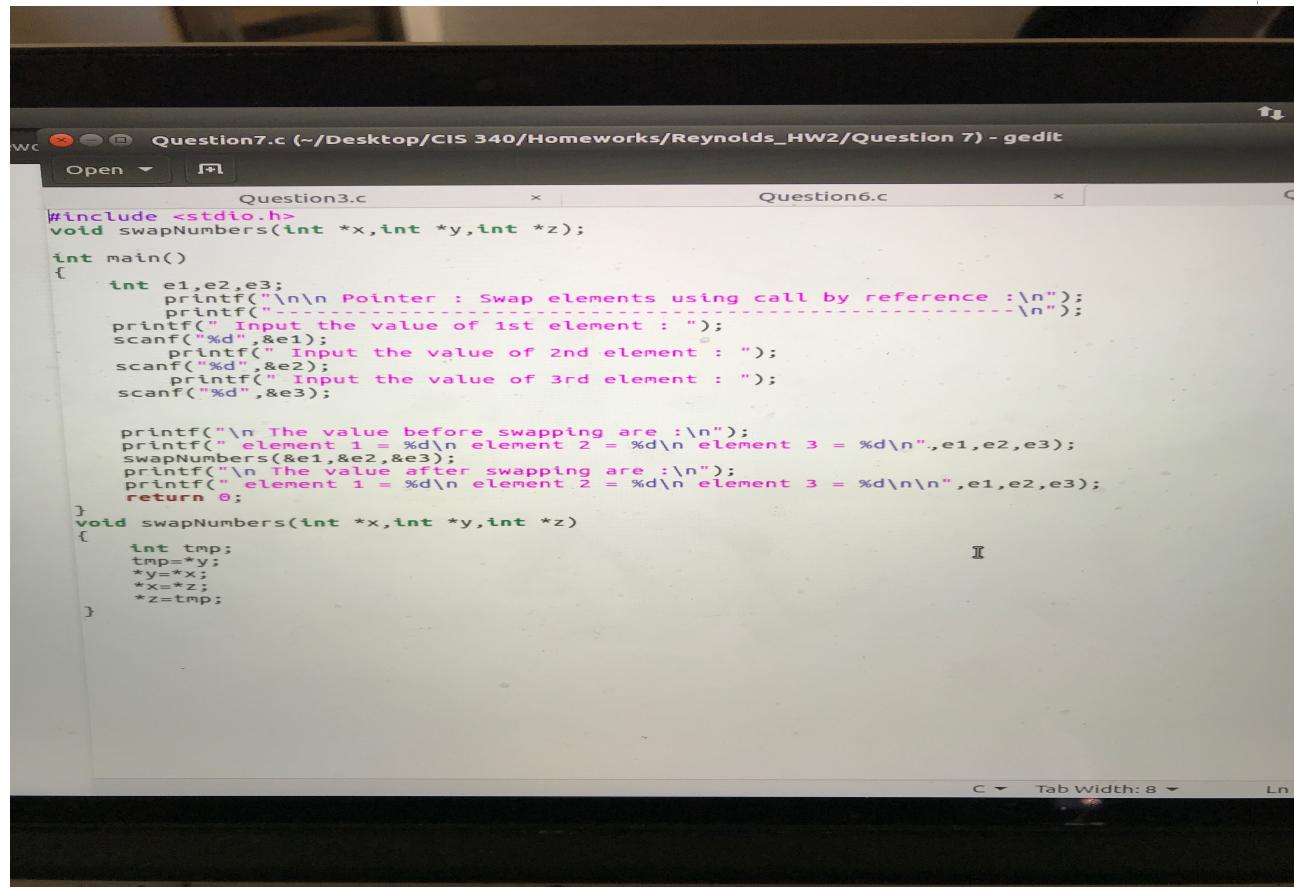
```
ryan@ryan-VirtualBox: ~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7$ ./Question7.c
bash: ./Question7.c: Permission denied
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7$ ./Question7.out

Pointer : Swap elements using call by reference :
-----
Input the value of 1st element : 5
Input the value of 2nd element : 6
Input the value of 3rd element : 7

The value before swapping are :
element 1 = 5
element 2 = 6
element 3 = 7

The value after swapping are :
element 1 = 7
element 2 = 5
element 3 = 6
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7$
```

int *y, int *z)



```
Question7.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7) - gedit
Open ▾  Question3.c  ×  Question6.c  ×  C  Tab Width: 8  L0

Question7.c
#include <stdio.h>
void swapNumbers(int *x,int *y,int *z);

int main()
{
    int e1,e2,e3;
    printf("\n\n Pointer : Swap elements using call by reference :\n");
    printf("-----\n");
    printf(" Input the value of 1st element : ");
    scanf("%d",&e1);
    printf(" Input the value of 2nd element : ");
    scanf("%d",&e2);
    printf(" Input the value of 3rd element : ");
    scanf("%d",&e3);

    printf("\n The value before swapping are :\n");
    printf(" element 1 = %d\n element 2 = %d\n element 3 = %d\n",e1,e2,e3);
    swapNumbers(&e1,&e2,&e3);
    printf("\n The value after swapping are :\n");
    printf(" element 1 = %d\n element 2 = %d\n element 3 = %d\n\n",e1,e2,e3);
    return 0;
}

void swapNumbers(int *x,int *y,int *z)
{
    int tmp;
    tmp=*y;
    *y=*x;
    *x=*z;
    *z=tmp;
}
```

Question 8:

```
ryan@ryan-VirtualBox: ~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 8
The value before swapping are :
element 1 = 5
element 2 = 6
element 3 = 7

The value after swapping are :
element 1 = 7
element 2 = 5
element 3 = 6

ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 7$ cd ..
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2$ cd "Question 8"
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 8$ ./Ques
tion8.out

Length of the Array: 3
Enter 3 number of elements in the array :
element 1: 9
element 2: 0
element 3: 4

Sorted array:
0 4 9
ryan@ryan-VirtualBox:~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 8$
```

```
Question8.c (~/Desktop/CIS 340/Homeworks/Reynolds_HW2/Question 8) - gedit
Open ▾  Question3.c  Question6.c  Question7.c

#include <stdio.h>
main()
{
    int *a,i,j,tmp,n;

    printf("\nLength of the Array: ");
    scanf("%d",&n);

    printf("Enter %d number of elements in the array : \n",n);
    for(i=0;i<n;i++)
    {
        printf("element %d: ",i+1);
        scanf("%d",a+i);
    }
    for(i=0;i<n;i++)
    {
        for(j=i+1;j<n;j++)
        {
            if( *(a+i) > *(a+j))
            {
                tmp = *(a+i);
                *(a+i) = *(a+j);
                *(a+j) = tmp;
            }
        }
    }
    printf("\nSorted array: \n");
    for(i=0;i<n;i++)
    {
        printf("%d ",*(a+i));
    }
    printf("\n");
}
```