Lab Assignment 4

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Contents

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1.1 Code

```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
int main()
{
    srand(time(NULL));
    printf("\n\n\n");
    unsigned long int a, i, _1 = 0, _2 = 0, _3 = 0, _4 = 0, _5 = 0, _6 = 0;
    for (i = 0; i < 600000; i++)
    {
        a = (rand() % 6) + 1;
        switch (a)
        {
        case 1:
            _1++;
            break;
        case 2:
            _2++;
            break;
        case 3:
            _3++;
            break;
        case 4:
            _4++;
            break;
        case 5:
            _5++;
            break;
        case 6:
            _6++;
            break;
        default:
            break;
        }
    }
    printf("\nNo. of times each number was counted: ");
    printf("\n 1: %ld", _1);
    printf("\n 2: %ld", _2);
    printf("\n 3: %ld", _3);
    printf("\n 4: %ld", _4);
    printf("\n 5: %ld", _5);
    printf("\n 6: %ld", _6);
    printf("\n\n\n");
    return 0;
}
```

1.2 Output

```
No. of times each number was counted:
 1: 100052
 2: 100231
 3: 99300
 4: 99874
 5: 100284
 6: 100259
```

2

2.1 Code

```c
#include <stdio.h>
int return_sec(int h, int m, int s)
{
    int sec;
    if (s > 60)
    {
        m = m + (s / 60);
        s = s % 60;
    }
    if (m > 60)
    {
        h = h + (m / 60);
        m = m % 60;
    }
    if (h > 12)
        h = h % 12;
    printf("\n Your entered time is: %d : %d : %d", h, m, s);
    sec = (h * 3600) + (m * 60) + s;
    return sec;
}
int main()
{
    printf("\n\n\n");
    int h, m, s, sec;
    printf("Enter the time (12-hour clock): ");
    scanf("%d%d%d", &h, &m, &s);
    sec = return_sec(h, m, s);
    printf("\n Seconds elapsed since last 12: %d", sec);
    printf("\n\n\n");
    return 0;
}
```

2.2 Output

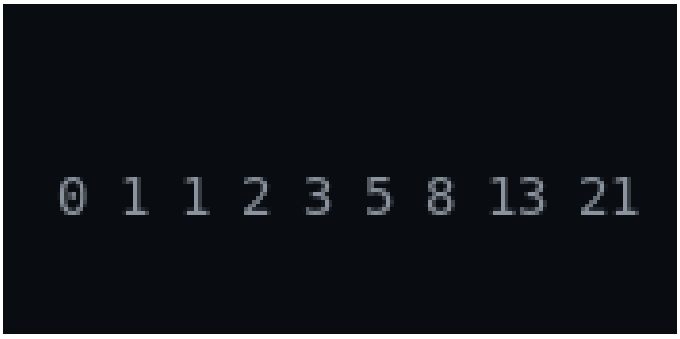
```
Enter the time (12-hour clock): 04 20 15

 Your entered time is: 4 : 20 : 15
 Seconds elapsed since last 12: 15615
```

3

3.1 Code

```c
#include <stdio.h>
int i = 1, a = 0, b = 1, c;
void fibanocci(int a, int b, int n)
{
    if (i == 1)
    {
        printf("%d %d ", a, b);
        i = 3;
    }
    else
    {
        c = a + b;
        printf("%d ", c);
        ++i;
        a = b;
        b = c;
    }
    if (i <= n)
        fibanocci(a, b, n);
}
int main()
{
    printf("\n\n\n");
    fibanocci(a, b, 9);
    printf("\n\n\n");
    return 0;
}
```

3.2 Output



4

4.1 Code

```c
#include <stdio.h>
double toYen(double us_dollar)
{
    return us_dollar * 118.87;
}
double toEuro(double us_dollar)
{
    return us_dollar * 0.92;
}
void chart(double dollar[5])
{
    printf("\n Dollar \t\t Yen \t\t\t Euro");
    for (int i = 0; i < 5; i++)
        printf("\n %lf \t\t %lf \t\t %lf", dollar[i], toYen(dollar[i]), toEuro(dollar[i]));
}
int main()
{
    printf("\n\n\n");
    double dol[] = {1, 2, 3, 4, 5};
    chart(dol);
    printf("\n\n\n");
    return 0;
}
```

4.2 Output

```
Dollar                  Yen                     Euro
1.000000                118.870000              0.920000
2.000000                237.740000              1.840000
3.000000                356.610000              2.760000
4.000000                475.480000              3.680000
5.000000                594.350000              4.600000
```

5

5.1 Code

```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
int flip()
{
    int a = (rand() % 2);
    return a;
}
int main()
{
    srand(time(NULL));
    printf("\n\n\n");
    int a, i, h = 0, t = 0;
    for (i = 0; i < 100; i++)
    {
        a = flip();
        if (a == 0)
            printf(" Heads ");
        else if (a == 1)
            printf(" Tails ");
        switch (a)
        {
        case 0:
            t++;
            break;
        case 1:
            h++;
            break;
        default:
            break;
        }
    }
    printf("\n No. of times tails: %d", t);
    printf("\n No. of times heads: %d", h);
    printf("\n\n\n");
    return 0;
}
```

5.2 Output

```
 Heads  Heads  Heads  Heads  Heads  Tails  Heads  Tails  Heads  Heads  Heads  Tails  Tails  T
ails  Heads  Tails  Heads  Tails  Heads  Heads  Heads  Tails  Heads  Tails  Heads  Tails  Hea
ds  Tails  Heads  Tails  Tails  Heads  Tails  Heads  Heads  Heads  Tails  Heads  Tails  Tails
  Heads  Tails  Tails  Tails  Heads  Tails  Heads  Tails  Heads  Tails  Tails  Heads  Heads
Tails  Tails  Tails  Tails  Tails  Heads  Tails  Heads  Heads  Tails  Heads  Heads  Tails  He
ads  Tails  Tails  Tails  Tails  Tails  Tails  Heads  Heads  Tails  Tails  Tails  Heads  Tail
s  Heads  Tails  Heads  Heads  Tails  Tails  Tails  Heads  Tails  Heads  Tails  Tails  Heads
 Heads  Tails  Heads  Tails  Tails  Tails  Heads
 No. of times tails: 47
 No. of times heads: 53
```

6

6.1 Code

```c
#include <stdio.h>
#include <stdlib.h>
int main()
{
    printf("\n\n\n");
    int a, num;
    char c, temp;
    start:
    num = (rand() % 1000) + 1;
    printf("\nI have a number between 1 and 1000");
    printf("\nCan you guess my number?");
    printf("\nPlease type your first guess: ");
    do
    {
        printf("\n a: ");
        scanf("%d", &a);
        if (a > num)
            printf("Too High. Try Again");
        else if (a < num)
            printf("Too Low. Try Again");
        else
            printf("Excellent! You guessed the number!");
    } while (a != num);
    scanf("%c", &temp);
    printf("\nWould you like to play again (y or n)?");
    scanf("%c", &c);
    if (c == 'y' || c == 'Y')
        goto start;
    printf("\n\n\n");
    return 0;
}
```

6.2 Output


I have a number between 1 and 1000
Can you guess my number?
Please type your first guess:
a: 200
Too Low. Try Again
a: 400
Too High. Try Again
a: 350
Too Low. Try Again
a: 380
Too Low. Try Again
a: 385
Too High. Try Again
a: 384
Excellent! You guessed the number!
Would you like to play again (y or n)?n

7

7.1 Code

```c
#include <stdio.h>
double roundToInteger(double a)
{
    double b;
    b = (int)(a + 0.5);
    return b;
}
double roundToTenths(double a)
{
    double b;
    b = (int)((a + 5) / 10);
    b *= 10;
    return b;
}
double roundToHundreds(double a)
{
    double b;
    b = (int)((a + 50) / 100);
    b *= 100;
    return b;
}
double roundToThousands(double a)
{
    double b;
    b = (int)((a + 500) / 1000);
    b *= 1000;
    return b;
}
int main()
{
    printf("\n\n\n");
    double x;
    printf("Enter a decimal number: ");
    scanf("%lf", &x);
    printf("\n Rounded off to nearest integer: %f", roundToInteger(x));
    printf("\n Rounded off to nearest tenths: %f", roundToTenths(x));
    printf("\n Rounded off to nearest hundereds: %f", roundToHundreds(x));
    printf("\n Rounded off to nearest thousands: %f", roundToThousands(x));
    printf("\n\n\n");
    return 0;
}
```

7.2 Output

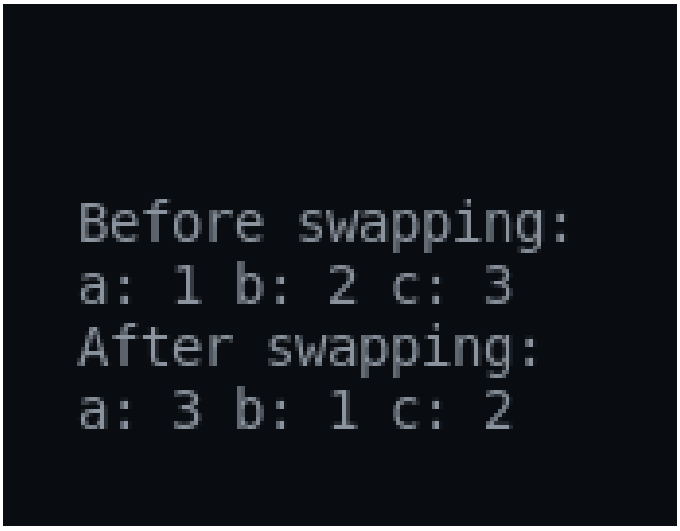
```
Enter a decimal number: 7549.24

 Rounded off to nearest integer: 7549.000000
 Rounded off to nearest tenths: 7550.000000
 Rounded off to nearest hundereds: 7500.000000
 Rounded off to nearest thousands: 8000.000000
```

8

8.1 Code

```c
#include <stdio.h>
void swap(int *x, int *y, int *z)
{
    int t;
    t = *x;
    *x = *z;
    *z = *y;
    *y = t;
}
int main()
{
    printf("\n\n\n");
    int a = 1, b = 2, c = 3, t;
    printf("\n Before swapping: ");
    printf("\n a: %d b: %d c: %d", a, b, c);
    swap(&a, &b, &c);
    printf("\n After swapping: ");
    printf("\n a: %d b: %d c: %d", a, b, c);
    printf("\n\n\n");
    return 0;
}
```

8.2 Output



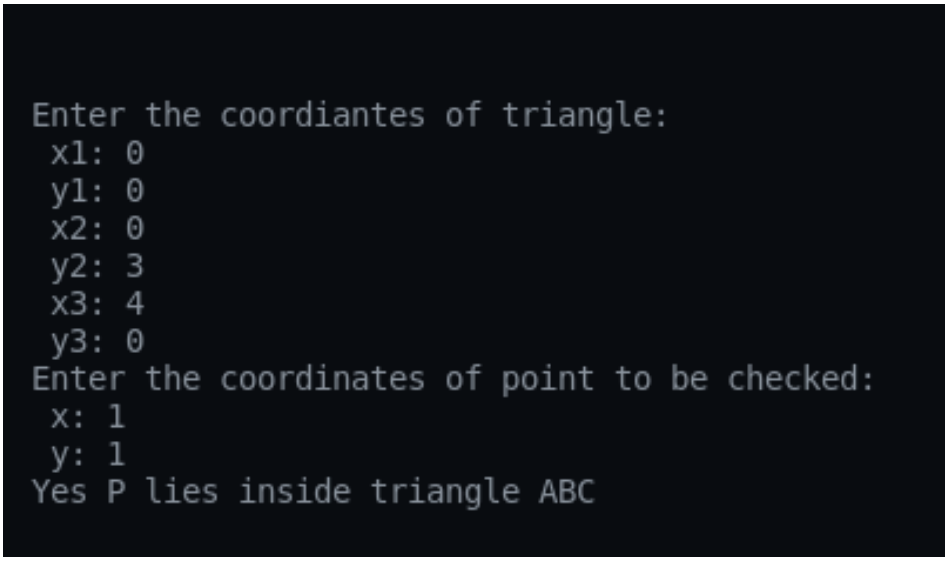
9

9.1 Code

```
#include <stdio.h>
#include <math.h>
float distance(float x1, float y1, float x2, float y2)
{
    return sqrt((pow((x2 - x1), 2)) + (pow((y2 - y1), 2)));
}
float area(float x1, float y1, float x2, float y2, float x3, float y3)
{
    float a, b, c, s;
    a = distance(x1, y1, x2, y2);
    b = distance(x2, y2, x3, y3);
    c = distance(x3, y3, x1, y1);
    s = (a + b + c) / 2;
    return sqrt(s * (s - a) * (s - b) * (s - c));
}
int check(float x, float y, float x1, float y1, float x2, float y2, float x3, float y3)
{
    float area_PAB = area(x, y, x1, y1, x2, y2);
    float area_PBC = area(x, y, x2, y2, x3, y3);
    float area_PCA = area(x, y, x3, y3, x1, y1);
    float tot = area_PAB + area_PBC + area_PCA;
    float area_ABC = area(x1, y1, x2, y2, x3, y3);
    if ((int)tot == (int)(area_ABC))
        return 1;
    else
        return 0;
}
int main()
{
    printf("\n\n\n");
    float x1, y1, x2, y2, x3, y3, x, y;
    printf("Enter the coordiantes of triangle: \n");
    printf(" x1: ");
    scanf("%f", &x1);
    printf(" y1: ");
    scanf("%f", &y1);
    printf(" x2: ");
    scanf("%f", &x2);
    printf(" y2: ");
    scanf("%f", &y2);
    printf(" x3: ");
    scanf("%f", &x3);
    printf(" y3: ");
    scanf("%f", &y3);
    printf("Enter the coordinates of point to be checked: \n");
    printf(" x: ");
```

```
    scanf("%f", &x);
    printf(" y: ");
    scanf("%f", &y);
    if (check(x, y, x1, y1, x2, y2, x3, y3))
        printf("Yes P lies inside triangle ABC");
    else
        printf("No P does not lies inside triangle ABC");
    printf("\n\n\n");
    return 0;
}
```

9.2 Output



10

10.1 Code

```
#include <stdio.h>
void design_rect(int l, int b)
{
    int i, j;
    for (i = 1; i <= b; ++i)
    {
        for (j = 1; j <= l; ++j)
        {
            if (i == 1 || i == b)
                printf("*");
            else
            {
                if (j == 1 || j == l)
                    printf("!");
                else
                    printf(" ");
            }
        }
        printf("\n");
    }
}
int main()
{
    printf("\n\n\n");
    design_rect(8, 5);
    printf("\n\n\n");
    return 0;
}
```

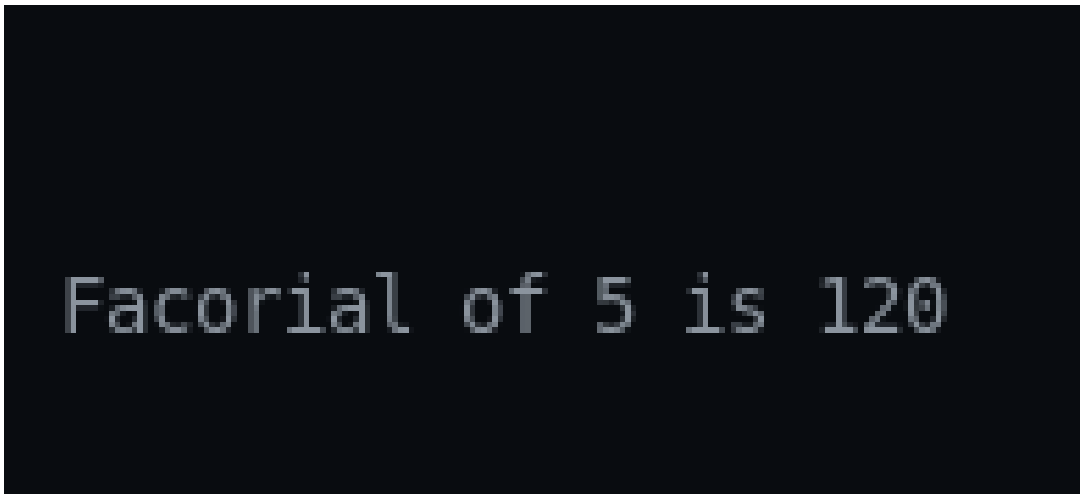
10.2 Output

11

11.1 Code

```
#include <stdio.h>
#include "fact.h"
int main()
{
    printf("\n\n\n");
    printf("Facorial of 5 is %d", factorial(5));
    printf("\n\n\n");
    return 0;
}
```

11.2 Output



12

12.1 Code

```c
#include <stdio.h>
#include <math.h>
int factorial(int n)
{
    if (n == 1 || n == 0)
        return 1;
    else
        return n * factorial(n - 1);
}
double series(int n)
{
    double s = 0;
    for (int i = 1; i <= n; ++i)
    {
        s += pow(i, i) / factorial(i);
    }
    return s;
}
int main()
{
    printf("\n\n\n");
    printf("The answer to the required series is: %lf", series(3));
    printf("\n\n\n");
    return 0;
}
```

12.2 Output

```
The answer to the required series is: 7.500000
```