Faculty of Engineering and Applied Science

SOFE 3950 Operating Systems

Tutorial Activity 2

Group Member 1

Name: Daniel Nucci
Student ID: 100655384

Group Member 2

Name: Avdon Racki
Student ID: 100661246

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Conceptual Questions

1. Some benefits of the C programming language include:
    - Flexible and versatile
    - Recognized worldwide and used in countless scenarios
    - Basic language and precursor to many modern advanced languages
    - Compiled language

An example of where C is used is in nearly every operating system available. From Windows to Linux to macOS nearly all operating systems include the C language.

2. A compiler takes human readable and programmable code and turns it into machine code. This process allows the computer to execute the code developers write.

3. A makefile lists all the required files and libraries that a program needs in order to compile or run properly. It is useful when compiling or installing programs. When using a makefile, the compiler knows which files it needs to incorporate into the project.

4. 5 header files from the C library include: math.h, signal.h, stdbool.h, stdint.h, and stdio.h. Math.h includes support for math functionality, signal.h includes support for signal handling, stdbooh.h includes support for boolean types, stdint.h includes support for integer types, and stdio.h includes support for input/output operations.

5. Some functions of the C libraries listed above include:
    - Math.h - cos(double x) - returns the cosine of a radian angle
    - Signal.h - raise(int sig) - causes a signal to be generated
    - Stdbool.h - this header does not include any functions but includes macros for true and false
    - Stdint.h - this header also does not include and functions but includes macros for a wide array of integer types
    - Stdio.h - fclose(FILE *stream) - this function closes an open file handle/stream

Application Questions

Question 1

task1.c

```c
#include <stdlib.h>
#include <stdio.h>
int main(void){
    int data[10] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
    int i;
    for (i=0; i < 10; i++){
        printf("%d ",data[i]);
    }
    printf("\n");
}
```

Question 2

task2.c

```c
#include <stdlib.h>
#include <stdio.h>
int main(void){
    double data[5] = {1.2, 5.5, 2.1, 3.3, 3.3};

    int i;
    for (i=0; i < 5; i++){
        if (data[i] > data[i+1]) {
            printf("Greater than. ");
        }
        else if (data[i] < data[i+1]) {
            printf("Less than. ");
        }
        else {
            printf("Equal to. ");
        }
    }
    printf("\n");
}
```

Question 3

task3.c

```c
#include <stdlib.h>
#include <stdio.h>
int main(void) {
    char data[] = "Hello World!";
    int i = 0;
    while (1) {
        if (data[i] != '\0'){
            printf("%c", data[i]);
        }
        else {
            break;
        }
        i++;
    }
    printf("\n");
}
```

Question 4

task4.c

```c
#include <stdlib.h>
#include <stdio.h>
int main(void){

    int i;
    for (i=1; i <= 10; i++){
        if (i % 2 == 0){
            printf("even ");
        }
        else{
            printf("odd ");
        }
    }
    printf("\n");
}
```

Question 5

task5.c

task5.c > ...

Daniel, 6 minutes ago | 1 author (Daniel)

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

double euclid_dist(int x1, int y1, int x2, int y2){
    return sqrt(pow((double)(x2 - x1), 2) + pow((double)(y2 - y1), 2));
}

int main(void) {
    int i;
    for (i = 0; i < 10; i++) {
        printf("%lf ", euclid_dist(rand() % 100, rand() % 100, rand() % 100, rand() % 100));
    }
    printf("\n");
}
```