Array of Structures Program

COSC-230
Assignment

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Topics

- Assignment

- Requirements

- Testing

- Plagiarism

- Submission

Task

- You will be writing three (3) assembly functions.

```
void look_at_room(const Room *r);
void look_at_all_rooms(const Room *rooms, int num_rooms);
Room *move_to(Room *rooms, const Room *current, int direction);
```

- The Room structure is defined as follows.

```
struct Room {
    char *title;
    char *description;
    int exits[4]; // 0 – N, 1 – E, 2 – S, 3 - W
};
```

C++ Version

```
void look_at_room(const Room *r)
{
    printf("%s\n%s\nExits: ", r->title, r->description);

    if (r->exits[0] != -1)
         printf("n ");
    if (r->exits[1] != -1)
        printf("e ");
    if (r->exits[2] != -1)
        printf("s ");
    if (r->exits[3] != -1)
        printf("w ");
}
```

C++ Version

```
void look_at_all_rooms(const Room *rooms, int num_rooms)
{
    int i;
    for (i = 0;i < num_rooms) {
        look_at_room(rooms + i);
        printf("\n");
    }
}
```

C++ Version

```cpp
Room *move_to(Room *rooms, const Room *current, int direction)
{
    if (current->exits[direction] != -1)
        return rooms + current->exits[direction];

    return nullptr;
}
```

Requirements

- You must <u>properly</u> use the stack so that you can call the asinf function.

- Match the output exactly. Do <u>not</u> take liberties with the output, including spaces and newlines.

- Make sure you use the appropriate sections for your instructions and string literals!

- Use the ABI names for registers
  - ABI names: t0, a0, s0, etc.
  - Index names: x10, x15, x20, etc.

Testing

- The .cpp template file executes your functions.

- A room file must be specified as a command line argument.

- Compile with the following command.

```
~> riscv64-unknown-linux-gnu-g++ -o lab lab.cpp lab.S
~> ./lab mud.rooms
```

Example #1

```
~> ./mud mud.rooms
Room #0
You are at the start. Your journey begins...
Exits: s

> l
Room #0
You are at the start. Your journey begins...
Exits: s

> n
You can't go north!

> e
You can't go east!

> s
You moved south.

> l
Room #5
You're near the start.
Exits: n e

> e
You moved east.

> l
Room #6
There are many passageways here.
It would be easy to get lost...
Exits: n e s w

> quit
```

Example #2

```
~> ./mud mud.rooms
Room #0
You are at the start. Your journey begins...
Exits: s

> lall
Room #0
You are at the start. Your journey begins...
Exits: s

Room #1
You see a portrait of a headless Dr. Marz hanging on the wall. What could
it mean?
Exits: s

Room #2
There seem to be some animal droppings in the corner. Gross.
Exits: e
```

All rooms are printed below but check the spacing!

Plagiarism Policy

- This is an **individual assignment**.

- You must NOT be able to see anyone else's code.

- Do NOT send your code and do not accept someone sending you code.

- Do NOT use any online source, such as Chegg, Stackoverflow, etc.

- You MAY use the online notes that I have created for you.

- You MUST cite anyone with whom you worked with, including classmates, students in another class, professors, and TAs.
  - Please note that even if you cite another student, professor, or TA, it does NOT mean you may share code.

- If you cannot attest to the truthfulness of not cheating using the bullets above. DO NOT submit your code. It is better just to get a 0 here and let it be done. If you proceed with copied code, the office of Student Conduct and Community Standards (SCCS) will become involved.

Submission

- Make sure your code compiles and assembles with the following command.

```
~> riscv64-unknown-linux-gnu-g++ -o lab lab.cpp lab.S
~> ./lab mud.rooms
```

- Replace **lab** with the name of your lab.
  - Make sure you have comments in your code, including a header and inline comments.
  - Submit only your .S file.

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