CSC 3320: System-Level Programming **50 Points**

Homework 2

© Instructor: Dr. Md. Mahfuzur Rahman **Fall 2024**

Work on the following problems and submit your own answers. You are allowed to discuss with other students. However, do not copy the solutions from peers or other sources. If the assignment has any programming component, your program(s) must compile with **gcc** and execute on **snowball.cs.gsu.edu**! Please see https://cscit.cs.gsu.edu/sp/guide/snowball for more details.

Instructions:

- Upload an electronic copy (MS word or pdf) of your answer sheet to the folder named "HW2" in iCollege.
- Please add the course number, homework number, and your name at the top of your answer sheet.
- Please write down your answers with the question number only in the answer sheet.
- Name your file in the format of CSC3320_HW2_FisrtnameLastname (.docx/.pdf)
- Deadline: Submit by October 04, 2024, 11:59 pm

An example answer applicable to all sub-questions of 1:

Question: Which of the following strings match(es) with `'ab+a'`? Multiple matches are possible. Give your explanation.

A. ababa B. aba C. abba D. aabbaa E. aa

Answer: b, c; Explanation: The matched strings must begin and end with 'a' and there must be one or more b in between.

1. Assume we are using extended regex (?, +, { }, *, [ ], |, and () are special characters **NOT** literals). Now, answer the following questions:
   i) (2 points) Which of the following strings match(es) with `'a[ab]*a'`? Multiple matches are possible. Give your explanation.
      A. ababa
      B. aaba
      C. aabab
      D. aabbaa
      E. aa
   ii) (2 points) Which of the following strings match(es) with `'a(bc)?'`? Multiple matches are possible. Give your explanation.
      A. abc
      B. a(bc)?
      C. a(bc
      D. a
      E. abcbc
   iii) (2 points) Which of the following strings match(es) with `'.[ind]*'`? Multiple matches are possible. Give your explanation.

A. wind
B. window
C. end
D. good
E. will

iv) (2 points) Which of the following strings match(es) with `'[a-z]+[a-z]*'`? Multiple matches are possible. Give your explanation.

A. a+b+c
B. +b
C. x
D. x+1
E. xc

v) (3 points) Which of the following strings match(es) with `'[a-z](\+[a-z])+'`? Multiple matches are possible. Give your explanation.

A. a+b+c
B. +b
C. x
D. x+1
E. x + a

vi) (3 points) Which of the following strings match(es) with `'[a-z]+[\.\?!]'`? Multiple matches are possible. Give your explanation.

A. good!
B. bad!
C. yes?
D. book.
E. all of the above.

vii) (3 points) Which of the following strings match(es) with `'(very )+(hot )?(good|bad|stormy)weather'`? Multiple matches are possible. Give your explanation.

A. good weather
B. very very hot weather
C. very good weather
D. very hot bad weather
E. very stormy weather

viii) (3 points) Which of the following strings match(es) with `'-?[0-9]*\.?[0-9]*'`? Multiple matches are possible. Give your explanation.

A. -123
B. . (just a decimal point)
C. 123.456
D. -123.456
E. all of the above
F. none of the above

Example answer applicable to questions 2 to 5:

Question: Write a regular expression for social security numbers in the format of 999-99-9999. Explain your answer.

Answer:

```
[0-9]{3}-[0-9]{2}-[0-9]{4}
OR \d{3}-\d{2}-\d{4}
```

Explanation: `[0-9]` means any valid decimal digit and `{3}` means repetition of any valid digit three times (i.e., three valid digits). So, `[0-9]{3}` will make sure three decimal digits (equivalent is `\d{3}`) at the beginning, `[0-9]{2}` ensures the middle two valid digits, and `[0-9]{4}` puts four valid digits at the end. These three groups of digits have been separated by literal hyphens (`-`).

2. (10 points) Write a regular expression for variable names which can be between 1 and 10 character long. Variable names must start with a letter or an underscore. The following characters can be letters or underscores or digits. Examples of valid variable names include `number`, `_name1`, `na021b1a2`. Explain your answer.

3. (10 points) Write a regular expression for passwords. Assume that the passwords are strings that contain at least 4 but not more than 10 characters. The passwords should have at least one upper case letter, one lower case letter, and one digit. Explain your answer.

4. (10 points) Write a regular expression for valid dates in the format: MM/DD/YYYY. Note 12/04/2005 is a valid date, but 13/20/1998 and 08/32/2012 are not. Explain your answer.

5. (10 points (bonus)) Write a regular expression for phone numbers in any of the following formats: 999-999-9999 or (999)-999-9999. (Note: these two formats should be matched by a single regular expression).

Question:	1	2	3	4	5	Total
Points:	20	10	10	10	0	50
Bonus Points:	0	0	0	0	10	10
Score:						