CS16, 10S, **W03**, due **Fri Lab 04.29**—Routing and Deadlock Game—Total Points: 50

Available online as http://www.cs.ucsb.edu/~pconrad/cs16/10S/homework/W03—printable PDF

Name: (4 pts) _____ Umail Address: (4 pts) _____ @umail.ucsb.edu

Lab Section (2 pts)—circle one: 9am 10am 11am noon unknown

(Note: For now, circle the lab section you are registered for on GOLD. If you need to request attendance at a different lab section because of an ACTUAL SCHEDULE CONFLICT, please email pconrad@cs.ucsb.edu with details)

---

This assignment is due **IN Lab on Friday, 04.29.**
**It may ONLY be submitted Lab, in ESB1003 (Cooper Lab) at 9am, 10am, 11am or noon on Friday.**
You must come IN PERSON to turn it in during your assigned Lab section.

**Late Policy:** No email submission allowed—and don't "slip it under my door". If you need to make it up, you must do so during office hours, or make an appointment to see me, and you must request this appointment within 48 hours of when the assignment was originally due.

**Personal Day/Sick Day policy**: Everyone is permitted one "personal day/sick day" when you get to make up a missed homework assignment for free during office hours or via appointment. After that, you may not make up the homework assignment—you can only earn back the points through extra credit opportunities.

(For more details, see the syllabus and the homework policy)

---

For this worksheet, the preparation is:

- playing the routing and deadlock game in lab (in person) on 04/30, and/or
- reading over the following web page that describes the game http://www.cs.ucsb.edu/~pconrad/csed/cs-unplugged/routing-deadlock/

Once you've done the preparation, write answers to these questions on this sheet (use the PDF link to print a copy of this if you weren't in class).

1. (16 pts) On the web page that describes the game (http://www.cs.ucsb.edu/~pconrad/csed/cs-unplugged/routing-deadlock/), scroll to the bottom and review the example strings that represent the game state.

   Then, for each of these, indicate whether it is a legal game state string, and if not, indicate why.

   The first two are done for you as examples—and there are more examples at the web page linked to above.

| string | ok? | explanation |
|---|---|---|
| `"rrooyyg "` | [YES] NO | This is a legal string for a four person game with colors r,o,y and g. |
| `"rooyygrg"` | YES [NO] | No space, so this one is no good. |
| `"bwpybwp "` | YES NO | |
| `"rbpgrbyg "` | YES NO | |
| `"rrooy ygbpbg"` | YES NO | |
| `"rrooy ygbprg"` | YES NO | |

**Please turn over for more...**

## Continued from other side

2. (12 pts) For each of the following, is is a legal sequence of moves? The first three are done for you as examples.

| string | ok? (circle one) | explanation |
|---|---|---|
| `"rro ygboyg"`<br>`"rroy gboyg"` | [YES] NO | legal |
| `"rro ygboyg"`<br>`"rrog yboyg"` | YES [NO] | The before and after strings are different in a place other than where the spaces appear. |
| `"rro ygboyg"`<br>`"rrooygb yg"` | YES [NO] | The object wasn't passed between two adjacent players. |
| `"roy rgbpboyg"`<br>`"royr gbpboyg"` | YES NO | |
| `"rroy gbpboyg"`<br>`"rroygb pboyg"` | YES NO | |
| `"rrooy gbyg"`<br>`"rrooyg byg"` | YES NO | |

3. (12 pts) For a 3 person game, starting with the string `"royro "`, indicate a complete sequence of legal moves, ending with `"rrooy "`.

   You might not need all the rows. There is a solution that reaches the goal in seven moves.
   Can you solve it in fewer than seven?

| | r | o | y | r | o | |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

---

End of W03