

Esame di Sistemi Operativi del 25 Settembre 2009 - Prova pratica

ESERCIZIO 1

Gli scacchi sono un gioco di strategia che vede opposti due avversari (Bianco e Nero). Il gioco si svolge su una tavola quadrata (scacchiera) divisa in 64 caselle di colore bianco e nero organizzate in 8 righe ed 8 colonne. Le righe sono numerate (dal basso verso l'alto) da '1' a '8', mentre le colonne sono contraddistinte dalle lettere dell'alfabeto (da sinistra a destra) da 'a' a 'h'. La scacchiera è orientata in modo che la casella nell'angolo in basso a sinistra di ciascun giocatore è nera. Su questa scacchiera si muovono 16 pezzi bianchi e 16 pezzi neri: 8 Pedoni, 2 Cavalli, 2 Alfieri, 2 Torri, 1 Donna e 1 Re per ciascun giocatore.

Realizzare uno script Perl, *display.pl*, invocabile con la seguente sintassi:

```
display.pl PEZZO GIOCATORE
```

- PEZZO è un nome del pezzo degli scacchi a scelta tra Pedone, Cavallo, Alfiere, Torre, Donna e Re
- GIOCATORE è un colore a scelta tra Bianco e Nero

E' ammissibile qualsiasi sottostringa che identifichi il pezzo e il giocatore. Ad esempio `display.pl Cav Ne`, è equivalente a `display.pl Cavallo Nero`.

Lo script deve stampare su standard output, a partire da una configurazione iniziale della scacchiera, le posizioni assunte dal PEZZO di un GIOCATORE durante le fasi di una partita di scacchi in base alle informazioni sulle mosse effettuate durante la partita; se il GIOCATORE ha a disposizione più di un PEZZO sulla scacchiera lo script deve visualizzare le posizioni di entrambe i pezzi.

Per ogni mossa che coinvolge il PEZZO lo script si deve occupare di stampare a video una rappresentazione grafica della posizione del PEZZO sulla scacchiera; per cui se il PEZZO è coinvolto in 2 mosse, lo script dovrà stampare a video 3 differenti scacchiere:

1. la scacchiera nella configurazione iniziale;
2. la scacchiera dopo la prima mossa del PEZZO (gli altri pezzi della scacchiera devono rimanere fermi nella configurazione iniziale);
3. la scacchiera dopo la seconda mossa del PEZZO (gli altri pezzi della scacchiera devono rimanere fermi nella configurazione iniziale);

Nel caso in cui, dopo una mossa, il PEZZO finisse in una casella occupata, il PEZZO sostituirà nella rappresentazione grafica il pezzo che occupava quella posizione.

La configurazione iniziale dei pezzi sulla scacchiera, per ciascun giocatore, è memorizzata nel file `./GIOCATORE/init.conf`, e viene rappresentata come una lista di elementi separata da virgola. Ogni elemento è composto da 3 caratteri: il primo carattere (in maiuscolo) identifica il pezzo degli scacchi (P=Pedone, C=Cavallo, A=Alfiere, T=Torre, D=Donna, R=Re), il secondo carattere

(minuscolo) e il terzo carattere rappresentano la casella (colonna e riga) in cui è posizionato il pezzo. Per esempio se il file Bianco/init.conf contiene la stringa:

Pb2, Rh2, Dg3

significa che sulla scacchiera, all'inizio (nella configurazione iniziale), il giocatore Bianco ha un Pedone nella casella b2 il Re nella casella h2 e la Donna in g3.

Le informazioni relative alle mosse effettuate durante la partita di scacchi, invece, si trovano all'interno del file ./moves.txt; le mosse sono memorizzate una per linea e hanno la seguente sintassi:

X(l,O)

in cui:

- X rappresenta il pezzo degli scacchi che è stato spostato con la mossa (P=Pedone, C=Cavallo, A=Alfiere, T=Torre, D=Donna, R=Re);
- l rappresenta la posizione iniziale del pezzo X prima della mossa;
- O rappresenta la posizione finale assunta dal pezzo X dopo la mossa;

Per esempio la mossa C(h5,f6) indica che il Cavallo in posizione h5 è stato spostato in posizione f6.

ESEMPIO

Supponiamo di avere la seguente configurazione iniziale:

```
./Bianco/init.conf: Pb2, Pf2, Pg2, Rh2, Ac3, Pe3, Dg3, Td4, Ph4  
./Nero/init.conf: Te8, Rg8, Pf7, Pg7, De6, Ag6, Ph6, Pb5
```

La seguente sequenza di mosse (./moves.txt):

```
P(h4,h5)  
A(g6,h5)  
T(d4,e4)  
D(e6,e4)  
D(g3,g7)
```

e di lanciare lo script display.pl con i seguenti parametri:

```
display.pl Donna Bianco
```

lo script restituirà in output le 2 scacchiere seguenti (si noti che i pezzi bianchi sono asteriscati, ad esempio la donna bianca è indicata come D*):

	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	
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