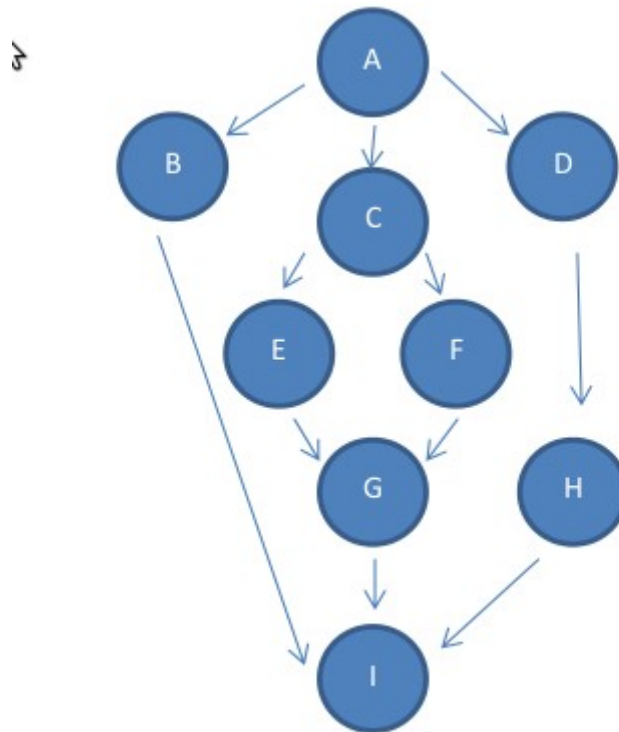# Operating Systems

Laboratory 11

Learning goals: in this laboratory activity you will practice with processes and threads. You will also improve your understanding of precedence graph, semaphores and pipes. Finally you will learn how to combine bash and awk scripts.

Exercise 1

Make the following precedence graph:
1. Using processes and synchronizing them by means of pipes;
2. Using threads and synchronizing them by means of semaphores;

Each circle represents a separate thread or process.

Exercise 2

Given a file containing a vocabulary in the following format:
Word1:
Translation1
Translation2
Translation3
...
#
Word2
Translation1
Translation2
Translation3
...

#

For each word a certain number of translations is available. Write a mixed bash and awk script that is used in the following way:

translate.sh [options] vocabulary inputfile outputfile

where:
- the first parameter is the name of a vocabulary file as specified before;
- the second parameter is the name of a file with the text to translate;
- the third parameter is the output file containing the translated text;

options include:

- –h | --help: prints a help message with the command sintax;
- –l | --longest: the script must replace each word in the input file with the longest translation possible for that word;
- –s | --shortest: the script must replace each word in the input file with the shortest translation possible for that word;
- –n Num: the script must replace each word in the input file with the translation at position Num in the vocabulary for each word;
- –v | --verbose: for each word such that a translation is not available the original word is written together with a warning message for each word which is not translated (the default behavior is not to print anything in place of the word if a translation is not available);

Summary
At the end of this laboratory activity you should have understood how to use threads and processes and how to synchronize them by means of pipes and semaphores. You should also have improved your understanding about writing mixed bash and awk scripts.