CS4215 Programming Language Implementation

Challenge D:
Mark-And-Sweep Garbage Collection

1   Setting

Early in the project (by Monday, 12/3), the interested student indicates his/her
intention to work on the project by email to the lecturer, with a rough outline
of the project schedule. Discussions with tutors and lecturer are done on a per-
need basis. A mid-way check will be around 20/3, with an informal meeting
(tutor and/or lecturer). The project completion date is on Friday, 30/3.

2   Goal

The goal of this challenge is to replace Cheney's algorithm by a mark-and-sweep
garbage collection algorithm, as described in the notes.
The biggest problem will be to handle the fact that heap nodes come in different
sizes. One simplistic approach would be to limit the size of nodes to something
reasonable, say 25 slots, and use that size for all nodes. Any nodes requiring
anything larger would lead to a runtime error. A more sophisticated approach
would be to allow for nodes of different sizes, and modify the free list to look for
free nodes of sufficient size. Both approaches are acceptable for this challenge.

3   Requirements

- Download `http://www.comp.nus.edu.sg/~cs4215/labtasks/week7_solution.zip`

- Modify `simPLvm.VM` to achieve the goal stated above.

- Submit the resulting file `VM.java`, and a brief text document that describes
  the approach you have taken.

4   Submission and Assessment

After project completion, the student sends all software and other documents
in a zip file to the lecturer via email. Please include instructions how to install

and run the application. The submission will be assessed by the tutors and lecturer. If the project goals are achieved, the student will be asked to present the solution in person to the lecturer and tutors. Sufficient achievement leads to issuing of an Assignment Voucher, which the student can use at the end of the semester to replace any module assignment score by full score.