

## 3<sup>rd</sup> Project

### AVL & Hashing

#### Building a Data Structure for Birzeit University

*Departments:* e.g. Computer Science, Mathematics, Civil Engineering, Physics, etc.

**Step 1:** build a sample departments file that contains department information records in the following format:

*Department name / Department\_related\_data\_file\_name*

(e.g. Computer Science / Computer\_Science.txt )

**Step 2:** using the data file created in step 1, build an AVL tree of Department nodes (use department name is key).

**Step 3:** implement the following functions on counties AVL tree:

- Print out department sorted.
- Search for a specific department
- Insert a new department.
- Delete a specific department.
- Calculate tree height.

**Step 4:** using the Department\_related \_date\_file\_name that stored in each tree department node, load the student's data that stored in each file. The student record data format in these files is as follow:

*Student\_full\_name /Student\_ID/ Average/Gender*

(e.g. Ahmad Ali/12000199 /85.4/M)

**Step 4:** create a Hash Table using the student's data from step 4 (Key: *Student\_full\_name*).

**Step 5:** implement the following functions on student hash table:

- Print hashed table (including empty spots).
- Print out table size.
- Print out used hash function.
- Insert a new record to hash table.
- Search for a specific record.
- Delete a specific record.
- Save hash table back to file.

**Good Luck!**