

B. Relation Schemas

Entity Set Relations:

- **Campaigns**(c_id, tupleNo, name, phase, start_date, end_date,)
- **Events**(e_id, tupleNo, name, event_date, start_time, end_time, address, city, region, material, cost)
- **Weblinks**(w_id, tupleNo, phase, content)
- **Cashflows**(t_id, tupleNo, flow_type, amount, association)
- Supporters E/R approach:
 - **Supporters**(s_id, tupleNo, name, gender, age, address, membership)
 - **S_Benefactors**(s_id, class)
 - **S_Memebers**(s_id, g_id, registration_date, campaign_count)
 - **SM_Employees**(s_id, g_id, salary)
 - **SM_Volunteers**(s_id, g_id, tier)

Relationship Relations:

- **Cashflows_Campaigns**(t_id, c_id, e_id, w_id, date_time)
- **Cashflows_Supporters**(t_id, s_id, date_time)
- **Operations_S_Members**(c_id, e_id, w_id, s_id, g_id, date_time)

Relation Schema Assumptions (reference to GnG_Database excel file)

1. Although some GnG members belong to other environmental groups, members will have no relationships with other environmental groups focusing only within the context of GnG campaigns.
2. Each campaign can have multiple events occurring within the campaign period which implies campaign name, phase, start date, end date, event name, date, start time and end time attributes.
3. Any address attribute will contain full mailing address strings and further Campaigns entity set contains additional city and region attributes for query use. Note region attribute is scaled only up to provincial level.
4. For any campaign events that takes place simultaneously can allow following scenarios:
 - Same campaign events in different cities
 - Different campaign events in same city
 - Different campaign events in different cities
5. Same events must occur on the same date, otherwise different event names are required.
6. GnG event includes:
 - Quiet phase
 - Kickoff phase
 - Public phase
7. GnG Volunteer must attend for public phase if registered in quiet phase but may/may not register for kickoff phase.
8. GnG employee may or may not attend for public phase if registered in either quiet phase or kickoff phase.
9. GnG supporters includes:
 - GnG members and nonmembers

- GnG members and nonmembers are non-overlapping subclasses
- 10. GnG members includes:
 - GnG employees and GnG volunteers
 - GnG employees and GnG volunteers are non-overlapping subclasses
- 11. GnG benefactors includes:
 - GnG members and nonmembers
 - GnG members and GnG benefactors are also overlapping subclasses of supporters
- 12. Cashflows relationship includes:
 - Cashflows-campaigns involving flow-in campaign fundraises and flow-out campaign expenses
 - Cashflows-supporters involving flow-in GnG supporter donations and flow-out GnG organization operations (annual rent, website and other costs)
- 13. Campaigns relationship includes:
 - Only GnG members which can be either GnG benefactors or non-GnG benefactors
- 14. Only outside of campaign flow-in cashflows can be associated to GnG supporters (including both GnG members and nonmembers) whereas any inside campaign of flow-in and flow-out cashflows as well as outside of campaign flow-out cashflows (GnG operations) will not be associated to any GnG supporters (including both GnG members and nonmembers).
- 15. Non-GnG supporters will not be funding for GnG organization or participating in any GnG campaigns.
- 16. Campaign count is only registered for tracking GnG members.
- 17. GnG member volunteer classification includes:
 - Tier 1 with ≥ 3 campaign counts
 - Tier 2 with ≤ 2 campaign counts
- 18. GnG benefactor qualification refers to:
 - Outside of campaign cumulative flow-in cashflow transaction $\geq \$1000.00$
- 19. GnG benefactor classification includes:
 - Class A referring to GnG members
 - Class B referring to GnG nonmembers
- 20. All relation tuples were inserted in a time sequential manner to simulate the historical database records.

