Games and Agents project proposal

Teus van Oosterom 3897095
Jan Geestman 6014526
Klaas Hidde van den Berg 3768309
Irena Cirkovic 4085787
Timon van Zanten 3784525
Project Goal
Our game is about a medieval settlement. The user plays the role of a dragon terrorizing this settlement who wants extra gold for their hoard. The villagers need to pay you so you will not eat them. Your job as the dragon is to optimize the village so you get more gold. The settlement is close to a dense forest that can be chopped. The wood can be sold to other settlements for gold, which the user needs to reward the villagers in the settlement for completing goals. The user needs to make sure there is enough food and housing available for the villagers.

The tasks the user can give are:
- Gather food (farms, hunting, fishing)
- Gather lumber (chop, logs sawing)
- Build houses (after prototype)

The amount of effort required for a specific task is determined by the skill level of a villager which is set randomly. Cooperation between villagers is possible, although the specific implementation of this has not yet been decided.
- Villagers can divide work to be more efficient but split the rewards. The downside of this is that work or required resources run out eventually, leaving no more work for the villagers splitting work, having them ending up with less reward than they could potentially have had.
- Villagers with different occupations or skill sets can decide on contracts between them which increases security but limits flexibility. E.g.: A lumberjack can form a contract with a woodworker that states the amount of gold for each piece of wood. This ensures the woodworker has wood for a stable price in times of shortage, but also ensures the lumberjack has a steady price in times of abundance.
- Villagers with the same job, for example cutting wood, split the reward so that if one (or more) have a bad day in chopping wood, the wage they receive is still enough.

The villager can opt not to work towards the user’s goals in the following conditions:
- If the villager is hungry
  - The villager buys food if it has enough gold
  - Goes out fishing/hunting if it has the required skills (this takes time and does not earn gold)
- If a neighbor of a villager has significantly more gold for goals
  - The villager will look into other tasks which will result in more gold
  - If the villager does not steal it can decide to move towards another settlement.

The driving motivation for villagers is to not die, either from hunger or by being eaten. Every villager needs to donate a certain amount of gold to the dragon at the end of every day. The game ends after $X$ years, with the score being the amount of gold donated to you by the villagers over that time period.
AI aspects

Goal directed (gameplay)
The villagers have a large scale goal of living (comfortably) which is achieved through reaching goals as having food and shelter. These goals will be obtainable through a few game mechanics which may pay out more or less. The agents will have to make their decisions which they assume to have the best results.

Auctioning
In this game the player sets various tasks they wish the villagers to perform. The villagers can accept tasks that are offered with a certain reward (or the reverse maybe, offer to take up tasks for a certain reward trying to bid low). They do this in an attempt to get the best deal for themselves, assuming they'll gain a net benefit out of it rather than working themselves to exhaustion for a reward that does not compensate.

Self-interest
An agent will not mindlessly try to fulfill every command of the player, they have their own goals and it is up to the player to make their commands line up with the agents’ goals. If this is not done, agents may decide to instead act self-servingly by just fishing for themselves or they might even migrate to areas they believe to be better for them.

Cooperation
As noted under “Project Goals” there will be a way in which agents can cooperate on tasks which they expect to yield them better results than they would achieve on their own. It is important that these cooperation structures aren’t strictly beneficial, otherwise there wouldn’t be any intelligent choice to make other than work together as much as possible.

Competition
With ask and demand, the prices can drop and it will only be worth it for villagers with high enough skill to produce enough to get a living wage out. Villagers with low skill at that task will then look if doing other tasks will give them a living wage since it is not beneficial for them to work below living wage.
Planning

<table>
<thead>
<tr>
<th>Week (Date)</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 (01 - 05)</td>
<td>Come up with game concept</td>
</tr>
<tr>
<td>19 (08 - 05)</td>
<td>05 - 08 deliver this document</td>
</tr>
<tr>
<td></td>
<td>Flesh out game mechanic specifics, set up game UI and the underlying variables and functions.</td>
</tr>
<tr>
<td>20 (15 - 05)</td>
<td>Basic game loop, register player input, have AI make basic decisions based on goals</td>
</tr>
<tr>
<td>21 (22 - 05)</td>
<td>simulate competing village</td>
</tr>
<tr>
<td>22 (29 - 05)</td>
<td>05 - 30 deadline prototype</td>
</tr>
<tr>
<td></td>
<td>A functioning economy based on food, wood and lumber. The economy is rivaled by one similar computer-controlled village which competes with you.</td>
</tr>
<tr>
<td></td>
<td>simulate happiness, introduce cooperation mechanic</td>
</tr>
<tr>
<td>23 (05 - 06)</td>
<td>Introduce auctioning over regular dividing of work</td>
</tr>
<tr>
<td>24 (12 - 06)</td>
<td>Add additional resources and methods to gain/lose them.</td>
</tr>
<tr>
<td>25 (19 - 06)</td>
<td>Debugweek - fix all the stuff we haven’t yet</td>
</tr>
<tr>
<td>26 (26 - 06)</td>
<td>06 - 30 submit project</td>
</tr>
</tbody>
</table>

Literature


