Hammurabi

Historically, Hammurabi was a Babylonian king who's claim to fame was a stone tablet on which can be found what may be the first example of written law in history.

Hammurabi, the game, is one of the original resource management games. You are given a kingdom to rule over for a 10 year period. You have 2 resources to manage; land and grain. In each turn you can buy and sell land for grain, you can allocate grain for your people, and use the rest of the grain to plant your land. Through trial and error you can find the optimal balance. However if that ever proves too much, you can always peek at the code.

Govern well and receive the accolades of your people. Govern poorly and not only will you be responsible for the deaths of many, but you will not be thought well of and may not be allowed to finish your 10 year term.

Hammurabi is written by Joseph Larson based on a BASIC program written by David Ahl as found in 'BASIC Computer Games' edited by David H Ahl (c) 1978 inspired by a Focal program from an unknown author.

HAMMURABI.C	You will need: a C/C++ complier .

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>

#define SHORT_LAND_MSG printf ("Hammurabi, think again."\
  " You own only %d acres. Now then,\n", acres)
#define SHORT_GRAIN_MSG printf ("Hammurabi, think again."\
  " You have only %d bushels of grain. Now then,\n", grain)

int pop, acres, grain, starved, born, yield, rats, food, year;

void resign (void) {
  printf ("Hammurabi, I can not do what you wish."
    " Get yourself another steward!\n");
  exit (0);
}

void endgame (int rank) {
  switch (rank) {
    case 0:
    printf ("Due to this extreme mismanagement you have not only been"
      " impeached\nand thrown out of office but you have been also declared"
      " a national fink!\n");
    break;
    case 1:
    printf ("You heavy handed performance smacks of Nero and Ivan IV."
      " The people\n(remaining) find you an unpleasant ruler and frankly"
      " hate your guts!!\n");
    break;
    case 2:
    printf ("Your performance could have been somewhat better but really"
      " wasn't\ntoo bad at all. %d people dearly would like to see you"
      " assassinated\nbut we all have our trivial problems.\n"
      , pop * (rand () % 80) / 100);
    break;
    default:
    printf ("A fantastic performance!!! Charlemagne, Disraeli, and Jefferson\n"
      "combined could not have done better!!\n");
  }
}

void report (void) {
  printf ("\n\nHammurabi, I beg to report to you;\n\n"
```

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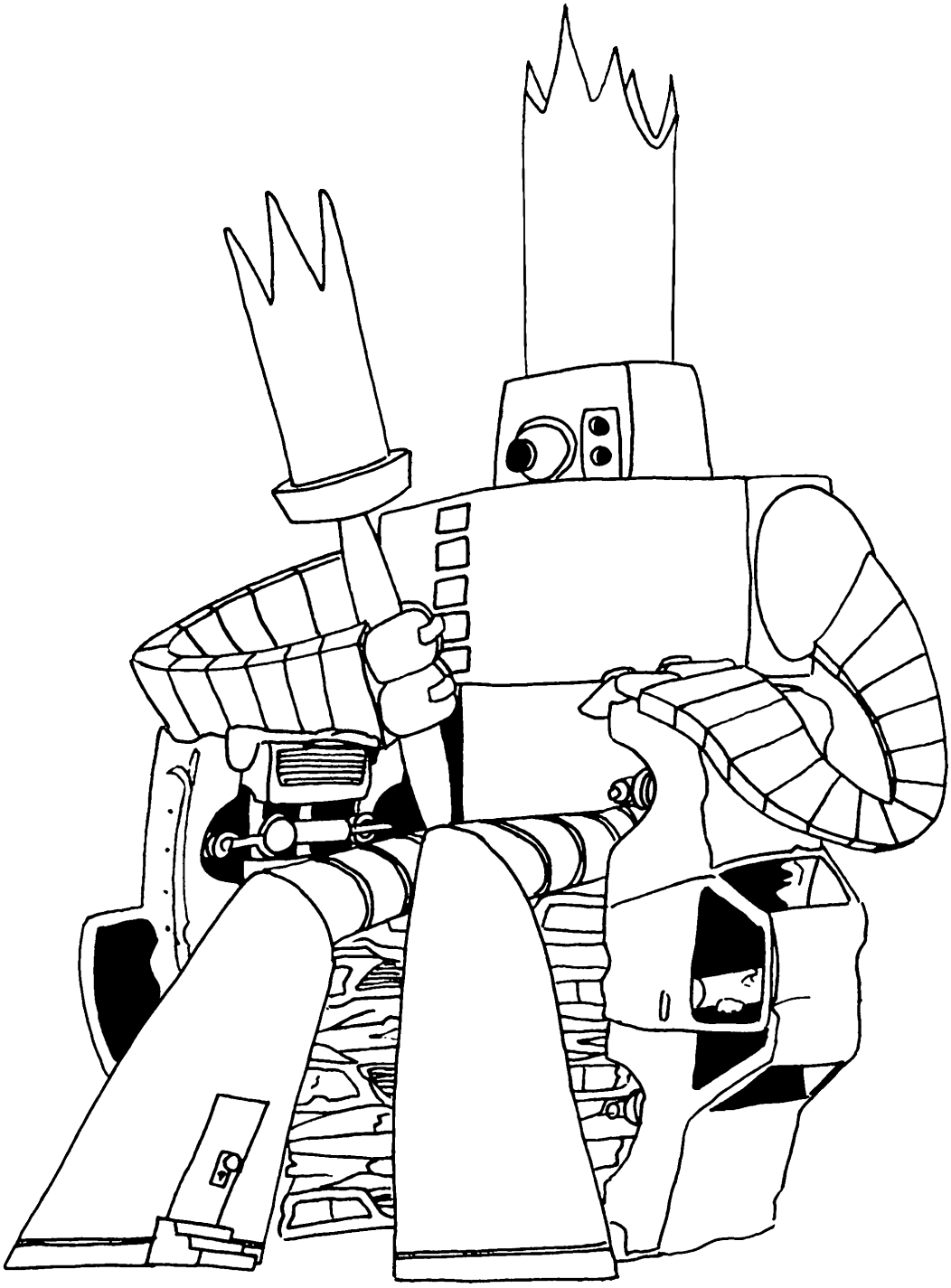
```
    "In year %d, %d people starved, %d came to the city.\n"
    , year, starved, born);
  if (rand() < (RAND_MAX / 100 * 15) && year > 1) {
    printf ("A horrible plague struck! Half the people died.\n");
    pop /= 2;
  }
  printf ("Population is now %d.\n"
    "The city now owns %d acres.\n"
    "You harvested %d bushels per acre.\n"
    "Rats ate %d bushels.\n"
    "You now have %d bushels in store.\n\n",
    pop, acres, yield, rats, grain);
}

void buysell (void) {
  int input, price;

  price = rand() % 10 + 17;
  printf ("Land is trading at %d bushels per acre.\n", price);
  printf ("How many acres do you wish to buy? ");
  scanf ("%d", &input);
  while (price * input > grain) {
      SHORT_GRAIN_MSG;
      printf ("how many do you wish to buy? ");
      scanf ("%d", &input);
  }
  if (input < 0) resign();
  if (input) {
    acres += input;
    grain -= price * input;
  } else {
    printf ("How man acres do you wish to sell? ");
    scanf ("%d", &input);
    while (input > acres) {
      SHORT_LAND_MSG;
      printf ("how many do you wish to buy? ");
      scanf ("%d", &input);
    }
    if (input < 0) resign ();
    acres -= input;
    grain += input * price;
  }
}

void feed (void) {
  do {
    printf ("How many bushels do you wish to feed your people? ");
    scanf ("%d", &food);
    if (food < 0) resign ();
    if (food > grain) SHORT_GRAIN_MSG;
  } while (food > grain);
}

void farm (void) {
  int input, v;

  do {
    v = 1;
    printf ("How many acres do you wish to plant with seed? ");
    scanf ("%d", &input);
```

Listing continued on page 3...

HAMMURABI.C	Listing Continued from page 1....

```
    if (input < 0) resign ();
    else if (input > acres) {SHORT_LAND_MSG; v = 0;}
    else if (input / 2 > grain) {SHORT_GRAIN_MSG; v = 0;}
    else if (input > 10 * pop) {
      printf ("But you only have %d people to tend the fields! Now then,\n"
      , pop);
      v = 0;
    }
  } while (!v);
  grain -= input / 2;
  yield = rand () % 5 + 1;
  rats = rand () % 5 + 1;
  rats = (rats % 2) ? grain / rats : 0;
  grain += input * yield - rats;
}

int main (void) {
  int cstarved = 0;
  int cps = 0;

  srand (time (NULL));
  printf ("Hammurabi\n\n"
  "Try your hand at governing ancient Summeria for a ten-year term of office.");
  pop = 100;
  grain = 2800;
  yield = 3;
  rats = 200;
  acres = 1000;
  born = 5;
  for (year = 1; year <= 10 && starved < pop * 45 / 100; year ++){
    report ();
    buysell ();
    feed ();
    farm ();
    born = ((rand () % 5 + 1) * (20 * acres + grain) / pop / 100) + 1;
    starved = (pop < food / 20) ? 0 : pop - food / 20;
    pop += born - starved;
    cstarved += starved;
    cps += starved * 100 / pop;
  }
  if (starved >= pop * 45 / 100) {
    printf ("\nYou starved %d people in one year!!!\n", starved);
    endgame (0);
  } else {
    year--;
    report ();
    cps /= 10;
    printf ("In your 10-year term of office %d%% of the people died per year\n"
      "on the average, IE a total of %d people died!\n", cps, cstarved);
    acres /= pop;
    printf ("You started with 10 acres per person and ended with %d acres per\n"
      "person.\n\n", acres);
    endgame ((cps<34 && acres>6)+(cps<11 && acres>8)+(cps<4 && acres>9));
  }
  exit (0);
}
```

```
HAMMURABI.EXE

Hammurabi

Try your hand at governing ancient summeria for a ten-
year term of office.

Hammurabi, I beg to report to you;

In year 1, 0 people starved, 5 came to the city.
Population is now 100.
The city now owns 1000 acres.
You harvested 3 bushels per acre.
Rats ate 200 bushels.
You now have 2800 bushels in store.

Land is trading at 21 bushels per acre.
How many acres do you wish to buy?
```



Author's Notes:

The key to managing your resources in Hammurabi is a calculator and a working knowledge of the variables in the game. Each person needs 20 bushels per year. Each person can work 10 acres and each bushel can seed 2 acres. Land value varies from 17 to 27 bushels per acre. Sell high, buy low. Knowing this you can plan an optimal spread each year, tho plagues and rats can still interrupt your work.

The order things happen in your turn can be switched around by changing the order the subroutines are called in the main() function. However you may find there is a reason buying and selling land comes first; if you have a poor harvest and busy rats it's possible that you will not have enough to feed your subjects and will need to liquidate some of your land assets. In that light perhaps the best enhancement would be to allow the player to choose the order that the various phases will occur in the game.

Another simple enhancement that would add a lot would be to make the ratios of land, people, and food variable and randomly chosen each game so that you have to experiment each time to play to find the optimal solution.