The Open University

User Guide

Hank Cognitive Modelling Environment

Version **1.0**

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Hank Production Team

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We are grateful to all the following, who helped and assisted Hank's development in various significant ways, and to all who took part in the evaluations.

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Introduction

Welcome to the user's guide for Hank — a special purpose cognitive modelling language that is designed to be easy for psychologists to learn and to use.

If you're an expert in cognitive modelling, or if you're just learning how to do it, Hank is a great tool to use, because it allows you to focus on the model you're building at a high level, reducing the amount of time you spend worry about programming.

About this guide

This guide will give you an overview of the Hank environment on a Windows computer. It is not a complete guide to cognitive modelling. If you want a fuller introduction to cognitive modelling in Hank, please contact us and ask for a copy of the *Cognitive Modelling Project* booklet, which covers all the basics of cognitive modelling.

The *Cognitive Modelling Project* booklet is designed to be independent of this computer program, and can be used to in a cognitive modelling course without the need for access to a computer at any stage.

However, Hank (at least when supported by a computer program) goes considerably more deeply into modelling than the *Cognitive Modelling Project* booklet can support.

This user's guide covers the Hank program for Windows, and shows how it can be used to build and run substantial cognitive models. It also covers all the advanced features of the Hank language which are not mentioned in the *Cognitive Modelling Project* booklet.

Contacting us

If you want to get in touch with the team that developed and is supporting Hank, you can send an email message to mailto:kmi-hank@open.ac.uk, or you can go to the web site http://kmi.open.ac.uk/projects/ hank/. Finally, you can also contact us by post at: Hank Support Group, Knowledge Media Institute, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK.

Registration

Although the Hank software is free, it would help us greatly if you would register your software. That way, we can inform you when new versions are available, and respond to any comments or requests that you may have regarding Hank.

To register

Enter the URL http://kmi.open.ac.uk/hank/register.htm into your browser, and complete the form it offers you.

Chapter 1. Getting started with Hank

Hank is a specially designed environment for designing, building, and running, and psychological cognitive models.

The Hank web site

There is a site on the world wide web dedicated to Hank, where you can find out about some of the models that have been developed using Hank, and where you can always get the latest version of the Hank program. To go to the Hank web site, enter the URL http://kmi.open.ac.uk/hank/ in your web browser.

You can also get the latest version of Hank from this web site, by entering the URL http://kmi.open.ac.uk/hank/downloads/, the downloads page of the Hank web site. This page will tell you how to get and install this latest version of the Hank program.

What computer do I need?

At the moment, Hank is only available for Windows computers, running Windows 95, 98, or NT. However, Hank should also work fine with Windows 3.1, using the Win32S upgrade pack. You can obtain this from us if you need it.

Installing Hank

Before you can use Hank, you need to install it. Hank is free and does not come with any copy protection — indeed, we encourage you to tell your friends about it. However, we would be grateful if you would register the program with us, so we can keep you informed with the latest developments in Hank, and so that we can provide a cognitive modelling environment that really meets the needs of psychologists.

To install Hank:

1. Put the Hank floppy disk into your PC's floppy disk drive
2. Start the Hank installer by selecting Start > Run…, then entering "a:setup" choosing OK.
3. Follow the guidance given in the Hank installation program.

Running Hank

To start Hank

1. Choose Start > Programs > Hank > Hank

If you installed Hank in a different program folder, choose that folder instead from the Start menu.

To leave Hank

1. Choose File > Exit

Chapter 2. Using Hank to build models

When you've managed to install and run Hank, you're ready to be begin building cognitive models.

If you're not familiar with cognitive modelling, this is the right time to get a copy of the *Cognitive Modelling Project* booklet, which will give you a good tutorial and overview of the modelling process, and cover most of the theory behind cognitive modelling.

Creating and opening Hank databases

In Hank, models are held in *databases*. The Hank software environment holds each database in a different file. You can create, open, and use as many databases as you like, even at the same time.

The New command allows you to create a new, empty, database file.

The Open… command lets you open an existing Hank database file. The command will offer you the standard file choosing window to let you choose the file.

Hank database files have the file extension "*.hnk*".

To create a new Hank database

1 Choose File > New

To open an existing Hank database file

1 Choose File > Open…

2 Choose the name of the Hank database file that you want to open, and select Open.

To save an open Hank database

1 Select the window containing the Hank database

2 Choose File > Save

To print an open database

1 Select the window containing the Hank database

2 Choose File > Print…

3 Complete the standard print dialog, and press OK to print the database

Note: You can change the print settings either in the Print… dialog, or by choosing the Edit > Page Setup… command.

Working with cards

The main building blocks of Hank models are cards. Hank uses two different kinds of fact, fact cards which are used to represent factual items — knowledge which is simply known, and instruction cards, which represent processes used to work out knowledge which isn't available directly, or at least shouldn't be according to your model.

Cards are created and changed using the Cards menu.

Using fact cards

To create a new fact card

1 Choose Cards > New Fact Card

This will add a new untitled fact card into the database.

Although they start with two rows and two columns, fact cards can have any number of rows or columns, and you can change the number of rows or columns at any time.

Changing the size of a fact card

1 Move the mouse to the bottom right of the fact card, over the resize tab, until the cursor

changes to the double-ended resize arrow ↘.

2 Drag the mouse to change the number of rows or columns.

Changing the contents of a fact card

Each fact card behaves a bit like a small spreadsheet. You can edit the data in each cell by clicking on the cell and typing a new value.

When the mouse is over a cell which can be edited, the pointer becomes a cell selector ✥

To change the contents of a cell

1 Move the mouse over the cell, until the pointer becomes the cell selector ✥

2 Click the mouse, and the cell's contents will become editable.

3 Type a new value into the cell.

4 When you're done, press the Enter key.

While editing one cell, if you press the Tab key, the contents of that cell will be entered and the next cell will automatically become editable. If you press Shift + Tab, the previous cell will become editable. Simply by typing new values separated by the Tab key, therefore, you can completely change a fact card's content.

Using instruction cards

To create a new instruction card

1 Choose Cards > New Instruction Card

This will add a new untitled instruction card into the database.

Although they start with a wish box containing two columns, instruction cards can have any number of columns, and you can change the number of columns at any time.

Changing the size of an instruction card's wish box

1 Move the mouse to the bottom right of the instruction card's wish box, over the resize tab, until the cursor changes to the double-ended resize arrow.

2 Drag the mouse to change the number of columns.

You can also change the size of the instruction card's process box, to give you plenty of room to describe how the instruction card will behave.

Changing the size of an instruction card's process box

1 Move the mouse to the bottom right of the instruction card's process box, over the resize tab, until the cursor changes to the double-ended resize arrow.

2 Drag the mouse to change the size of the process box.

Changing an instruction card's wish box

An instruction card's which box behaves just like a fact card, except that you can't change the number of rows. To edit the wish box, when you change the instruction card's title, column labels, and so on, you move the mouse over the cell until the pointer changes to the cell selection pointer ✥, and then click.

To add a question to an instruction card's process box

1 Select the instruction card

2 Choose Cards > New Question Box

If you want to add a built in question from the Gallery, choose Cards > New Question from Gallery… instead.

Hank always starts a process with the question box at the top left of the process box. To arrange this, and to ensure that the layout of the process box is nice and neat, you will probably want to move question boxes around inside an instruction card.

To move a question box in an instruction card

1. Move the mouse over the question box.
2. Drag move the question box until it is where you want, and then let go the mouse button.

Note: If the question box is already selected, towards the edges of the question box the pointer may change to the link pointer *or the resize pointer, Hank will try to link questions or resize a question rather than move one. To move a question, make sure that the pointer is either the usual arrow, or the cell selection pointer* .

Hank runs a process by asking questions, and then following a link arrow that matches the status of the previous question. To build a proper process, then, you need to be able to link questions together.

To link one question to another

1. If the first question isn't already selected, select it by clicking on it with the mouse.
2. Move the mouse to the edge of the first question, where you want to link from, and wait for the cursor to change to the link pointer .
3. Drag the link to the question box you want to link to, until the target point highlights. When you let go the mouse button, a new link will be created.

Links can either be unlabelled (in which case Hank can always follow the link) or they can be labelled "OK" or "Fail", in which case Hank will only follow the link if it matches the current status. This means you need to be able to change a link's label.

To change a link's label

1. Select the link by clicking on it with the mouse
2. Change the link's label by choosing an appropriate command from the Edit menu.
   - To remove a link's label choose Edit > Unlabel Link.
   - To set the link's label to "OK" choose Edit > Label Link "OK".
   - To set the link's label to Fail choose Edit > Label Link "Fail".

To delete a card, question box, or a link

1. Select the card, question box, or link.
2. Choose Edit > Delete, or press the Del key.

Managing a large database

Instruction cards and fact cards can grow to be quite big, so Hank provides a way of 'folding' cards to make them smaller. This can help you to fit many more cards into a database in an accessible form.

To fold a card

1. Select the instruction card
2. Choose Edit > Fold Card

Alternatively, you can double-click on a card's title to fold it, if it is currently not folded.

To unfold a card

1. Select the instruction card
2. Choose Edit > Unfold Card

Alternatively, you can double-click on a card's title to unfold it, if it is currently folded.

Running models in Hank

At any time, you can ask Hank to try to run your model, even if it is not yet fully complete. The commands needed to run models are all the Ask menu.

Hank allows you to run models in two different ways, briefly and in full. If you ask a question briefly, it is run as fast as possible, and (apart from tracing built into the model, through

"Say" questions, for example) little feedback is given. If you run a model in full, it is run through the workspace so you can see every single intermediate step in the model's action.

To run a model briefly

There are two different ways of running a model briefly. You can do either of the following:

- Use the control panel
- Select a question, then use the Ask > Ask Briefly command

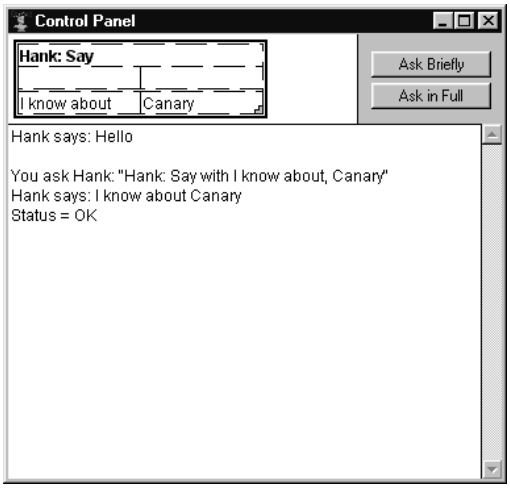
Using the control panel

The control panel is a special window that you can use to ask Hank's question processor to work something out for you.

To open the control panel

1 Choose Window > Control Panel, or press the F9 key

Then the control panel, which looks like this, will appear.



There are three parts to the control panel, a question panel, a button panel, and a transcript window.

If you press "Ask Briefly" the question currently in the question panel will be put to the question processor immediately, and the response printed.

To ask a question briefly using the control panel

1 Change the question, as if it was a fact card

2 Press "Ask Briefly"

To ask a question in full using the control panel

1 Change the question, as if it was a fact card

2 Press "Ask in Full"

If you press "Ask in Full" the question will be passed to the workspace window, where you can watch the question processor run your model in much fuller detail.

Note: You can copy the contents of the transcript window by selecting it and using Edit > Copy. You can then paste the entire transcript into a word processor, for example.

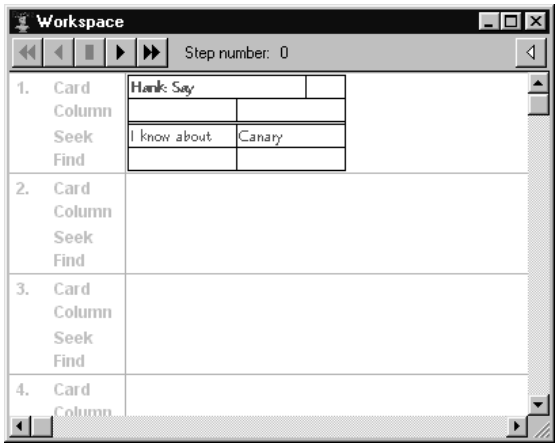
Using the workspace window

Once a question has been passed to the question processor, you can use the workspace window to watch it working the answer out for you.

To open the workspace window

2 Choose Window > Workspace, or press the 10 key

Then the workspace window will appear.



At the top of the workspace window is the stepping panel, which contains a set of buttons

vaguely resembling those you find on a video or cassette recorder.

The buttons work like this:

Rewind. The button returns the question to its starting state. If you want to stop rewinding, press the **Stop** button.

Back. This button moves the question back one step.

Stop. If the question is currently rewinding or running, pressing this button will stop it.

Step. This button moves the question forward one step. To single step a model, simply press this button repeatedly.

Run. This button runs the model forwards, until the end. To stop running the model, press the **Stop** button.

As you run through the workspace window, each new instruction card is shown as a new row in the workspace. Also, questions are shown in two colours as they run. First they are shown in red (the Ask) step, and then they are shown in black (the Match) step.

Running questions from the model

You don't have to use the control panel to ask questions. You can also ask them directly from the model, in two ways.

Asking questions from the model

1 Select the question you want to ask (it may be a step in an instruction card)

2 Choose Ask > Ask Briefly or Ask > Ask in Full

This will copy the question into the control panel and automatically choose the "Ask Briefly" or "Ask in Full" button for you.

User query cards

The other way of asking questions directly from the model is to use user queries. These look and behave like question boxes, except that they can live outside an instruction card.

To add a user query to a database

1 Choose Cards > New User Query

2 Change the contents of the new user query, so that matches the question you want to ask.

To run a user query

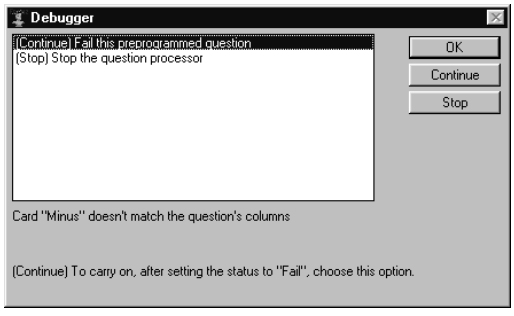
Simply double-click the user query. This is the same as selecting the user query and choosing Ask > Ask Briefly. It will copy the user query into the control panel and choose the "Ask Briefly" button, running it immediately in the control panel.

Note: You can also hold down the Alt key while double clicking. This is the same as selecting the user query and choosing Ask > Ask in Full. The user query will be passed to the workspace window for a full run.

The debugger

Like any programming language, Hank models sometimes hit problems. When this happens, Hank will often display the debugger window.

The debugger window describes the problem, and gives you a list of options for carrying on. Generally speaking, it's usually best to choose "OK" to accept Hank's recommended option.



Often this option will allow you to carry on, even in the middle of running a question.

Chapter 3. Doing more with Hank

There are a lot of additional sides to the Hank language that aren't covered in either the previous chapter, or even in the *Cognitive Modelling Project* booklet.

Some of these features are special to the computer environment; you can export models in a form that you can include in a word processed report, for instance. Many of these features are straightforwardly similar to other computer programs. Printing, for example, works in Hank more or less identically to any other computer program in Windows.

However, there are a number of features that are special to the Hank language, which may help you to develop rather more powerful models than you have seen so far.

Built in questions

So far, you will mostly have come across questions that the question processor handles through your own fact and instruction cards. However, Hank has a lot of 'built in' questions which it can answer itself; you can think of these as working by using built in instruction cards.

Some of these built in questions can do things that would be impossible to do in any other way. For example, there is a built in question you can ask ("Hank: Add to Card") which adds a new row to a fact card, and there are a whole bunch for mathematics, addition, subtraction, and so on.

You can see the full list of built in questions by using the New Question from Gallery… command. This opens the Gallery, described in chapter 4, which lists and describes all the built in questions that Hank knows about. For more details, see chapter 4.

To open the Gallery of built in questions

1 Choose Cards > New Question from Gallery…

Whatever happened to backtracking? "Ask" and "Ask All"

Hank does not support backtracking, so once you've explored one match from a fact card, Hank will not automatically go back and look for another match if the process fails somewhere further down the line.

This is the normal behaviour in Hank, and is implemented by the "Ask" built in question. In other words, the two questions:

Is a kind of	
Category	Superordinate
Canary	?What?

Hank: Ask: Is a kind of	
Category	Superordinate
Canary	?What?

are identical in all respects.

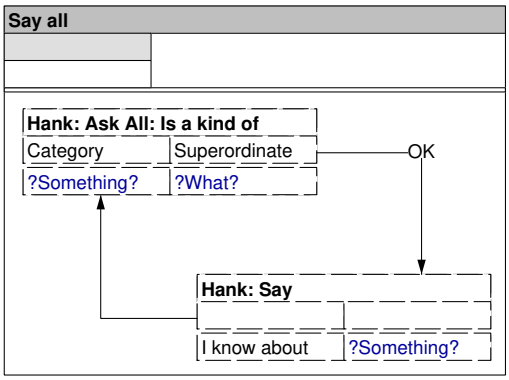
Ask will always give you the first match that is available. It works with both fact cards and instruction cards.

This can sometimes be quite limiting, as it means there is no way to look for all the possible matches. To overcome this limitation, Hank provides a special built in question "Ask All", which lets you check all the available matches in order, but which only works for a fact card. You might use it like this:

Hank: Ask All: Is a kind of	
Category	Superordinate
?Something?	?What?

This question would pick up the first row in the "Is a kind of" fact card with status "OK", and then, if you go back into it, would pick up the second row with status "OK", and so on. Only

when no more matching rows are available would the question fail. The following instruction card shows this pattern in practice:



You can use "Ask" and "Ask All" (which you can think of as providing explicit backtracking within an instruction card) to provide all the important behaviour of backtracking, while still remaining fairly easy to understand.

Composite matching

Composite matching is a way to treat a value as something that can be divided, manipulated in separate parts, and then recombined.

A value in Hank is actually a list of elements. For example, the value "1 + 2 = 3" is actually made up of five elements.

A single variable can match against any number of elements, so if you use single variables everywhere, you don't even need to be aware of composite matching. Composite matching only happens when you use more than one variable in a cell, or when you mix variables and values in a cell.

Let's look at some examples:

Pattern	Value	Match result
?Sum?	1 + 2 = 3	?Sum? = 1 + 2 = 3
?A? + ?B? = ?C?	1 + 2 = 3	?A? = 1 ?B? = 2 ?C? = 3
?Sum? = 3	1 + 2 = 3	?Sum? = 1 + 2
?Sum? = 4	1 + 2 = 3	*No match*

You can also use variables that have an acquired value in composite matching, and to construct values. So, for example, if ?Sum? has the acquired value "1 + 2", a value "?Sum? = 3" will behave as "1 + 2 = 3".

Another important point about composite matching is the way that lists of different lengths are handled. Here the approach is simple: when a list of variables match a list of values, every variable must have at least one value, and the first variables take a value each, and the last takes any that are left over.

Let's look at some examples of this:

Pattern	Value	Match result
?A?	1 2 3 4	?A? = 1 2 3 4
?A? ?B? ?C? ?D?	1 2 3 4	?A? = 1 ?B? = 2 ?C? = 3 ?D? = 4
?A? ?Rest?	1 2 3 4	?A? = 1 ?Rest? = 2 3 4
?A? ?B? ?C? ?D?	1 2 3	*No match*

Composite matching, then, uses a sequence of values in a pattern to cut up a value into a corresponding sequence of values for each sequence of variables. Then the list matching rules are applied. The end result is exceedingly powerful. For example: "?X? remember ?Y?" will match "I can remember last Sunday's picnic", so that ?X? will acquire the value "I can", and ?Y? "last Sunday's picnic".

Getting Hank to talk

It is often useful to get Hank to print out some text as the model runs. You can use this either to provide a 'behind the scenes' watch on the model's behaviour, or actually as part of the model itself — modelling, for example, a participant's responses to stimuli.

To ask Hank to print out something, you can use the built in questions "Say" and "Say In Dialog". For example, the question:

Hank: Say	
I know about	?Something?

will, when Hank runs it, print out:

Hank says: I know about Canary

in the transcript part of the Control Window, if the variable ?Something? currently has the value Canary. The "Say" built in question always sets the status to "OK".

The other built in question, "Say In Dialog", is rather similar, except that the text is written in a dialog window rather than in the transcript. The dialog contains an "OK" button and a "Fail" button, and the status will be set to correspond to the button chosen. You can, therefore, use the "Say in Dialog" question to ask someone which course of action to follow.

Changing the database

One of the more powerful features of Hank is that a model can *change* the fact cards that it uses, as well as just matching on them.

There are four built in questions that you can use to do this, and they come in pairs. "Add to Card" and "Remove from Card" are the simplest to use, they simply add a new row, or remove an existing row, from a fact card. If the fact card doesn't exist, it will be created.

Alternatively, you can change a fact card using "Get Cell Value" and "Put Cell Value", which allow you to treat a fact card more as if it is a proper spreadsheet, reading and writing a cell's value by specifying the row and column for that cell.

Note: in all cases, Hank will make the changes to the database immediately, so you can see fact cards change within the database as your model runs.

To add a new row to a fact card

Use a question a bit like this:

Hank: Add to Card: Is a kind of	
Category	Superordinate
?Value?	Animal

A new row will be added to the end of the fact card, containing whatever is in the variable ?Value?, and the value Animal.

To remove a matching row from a fact card

Similarly, you can use a question like this:

Hank: Remove from Card: Is a kind of	
Category	Superordinate
?Value?	Animal

to remove a matching row from a fact card. The first matching row within the fact card will be removed.

Hint: Using "Add to Card" and "Remove from Card" together, you can give models a kind of 'memory', so that they can remember (and also forget) previous results.

To get a cell's value from a fact card

To get a cell's value, you can use a question like this:

Hank: Get Cell Value: Is a kind of		
Column	Row	Result
Superordinate	1	?Value?

You can refer to the column either by name or by number. In this case, the question will put the contents of the given cell into the variable ?Value?.

To change a cell's value in a fact card

To change the value of a cell in a fact card, you can use a question like this:

Hank: Put Cell Value: Is a kind of		
Column	Row	Value
Superordinate	1	Animal

Again, you can refer to the column either by name or by number. In this case, the value in

the Superordinate column, in the first row, will change to Animal.

Hint: Using "Get Cell Value" and "Put Cell Value" together, you can treat a fact card as a two-dimensional array. This can be very useful for mathematically oriented models, such as those based on parallel distributed processing.

Draw values

So far, every value that you've seen has been drawn by Hank as simple text. Sometimes, though, it is useful to draw text differently, using different colours, or even to simply fill in cells in a fact card with coloured blocks.

Draw values let you do this. If a value begins "Draw:" it can contain a set of keywords and values which tell Hank to draw the value differently. The keywords end with a semicolon.

So, for example, "Draw: Colour: Red; Hello World" would be drawn as "Hello World", but in red text. "Draw: Background: Green; This is green" would be drawn as "This is green" on a green background. You don't even need text to follow the semicolon, so, for example "Draw: Background: Grey" simply fills a cell with grey.

Underneath, Hank uses the full text as the value, so if you click on one of these values, the full text is shown and can be changed.

Hank currently only knows about two draw value keywords, "Colour" and "Background", both of which take a colour value. The colours allowed are "Red", "Green", "Blue", "Magenta", "Cyan", "Yellow", and "Grey" (or "Gray") — all of which may be preceded by either "Light" or "Dark". Hank also allows "White" and "Black".

Exporting pictures from Hank

Currently Hank does not allow cards to be copied as pictures to be pasted into a word processor.

If you want to embed a graphic from Hank, you can use the File > Export… and File > Export Selection… commands.

To export a whole window

1. Select the window
2. Choose File > Export…
3. Enter the file name and export format type for the file you wish to create. Currently, Hank only supports the EPS (Encapsulated PostScript) graphic format.
4. Choose Save to export the file

The File > Export… command will work both for a database window, and also for a workspace window.

To export part of a database window

1. Select the window and within it, the objects you wish to export.
2. Choose File > Export Selection…
3. Enter the file name and export format type for the file you wish to create. Currently, Hank only supports the EPS (Encapsulated PostScript) graphic format.
4. Choose Save to export the file

The File > Export Selection… command will only work with database windows, not with the workspace window. You cannot export a selected part of a workspace window.

To include an exported picture in a word processor file

Check the documentation that comes with your word processor. In Microsoft Word, for example, you can choose Insert > Picture > From File… and select the file containing the exported Encapsulated PostScript file.

Note: Currently Hank does not save a picture preview for exported EPS files. This means that the included element is unlikely to display properly in the word processor. It will, however, print properly on a PostScript printer.

Chapter 4. The Gallery

Hank's computer environment offers a large range of built in questions that you can ask. A full list of these questions is available in the Gallery. (If you can't find a special question that you need here, it's worth checking the computer environment, because new releases of the program sometimes include new built in questions. If you still can't find it, let us know — we may be able to add it in a new version.)

Using the Gallery

The gallery describes all the built in questions you can use in Hank.

To open the Gallery

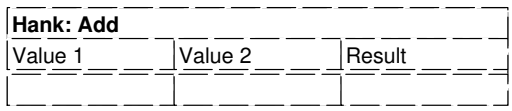
1. Choose Cards > New Question from Gallery…

To add a built in question

1. Choose Cards > New Question from Gallery…
2. Select the built in question from the displayed list of all available questions.
3. Choose Add to Database to add the question to the database. If an instruction card is currently selected in the database, the question will be added into the process box of the instruction card. Otherwise, the new question will be added as a new user query.

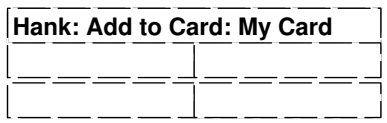
Currently, Hank provides all these built in questions. The descriptions are all shown in the Gallery window as well as here in this reference, so if you are unsure of the exact behaviour of a built in question, the Gallery itself may be able to help you choose which built in question to use.

Hank: Add



Use the Add card to add two numbers together. If you put the numbers you want to add into the first two columns, and an empty value box in the third, Hank will add the numbers and put the answer into the empty value box.

Hank: Add to Card

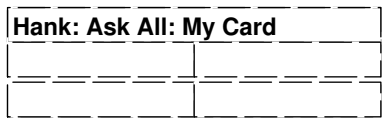


Use Add to Card if you want to add a new row to a Fact Card. Give the name of the Fact Card in the title, for example, to add to a card "Upon", use "Hank: Add to Card: Upon". Hank will then look for this Fact Card, or make it if needed, and then add the new row at the end of the card.

Hank: Ask

Use the Ask card to look for a match in a Fact Card, Give the name if the Fact Card in the title, for example, to look in a card "Upon", use "Hank: Ask: Upon". Hank will then look for this Fact Card, and will try to find a matching row. If a row is found, Hank will set the status to OK, otherwise Fail.

Hank: Ask All



Use the Ask card to look for a number of matches in a Fact Card, Give the name if the

Fact Card in the title, for example, to look in a card "Upon", use "Hank: Ask All: Upon". Hank will then look for this Fact Card, and will collect all the matching rows. Each time you return to this question, you'll get the next matching row until none are left, when Hank will set the status to Fail.

Hank: Ask In Dialog

Hank: Ask In Dialog
Pattern

Use the Ask In Dialog card to get some input from a user. Hank will then put up a dialog window and offer the user a chance to type in a value. This value will then be matched against the pattern in the Pattern column. If the two match, then the status is set to OK and any variables in the pattern will acquire values. However, if they don't match, or if the user doesn't give a value, the status will be set to Fail.

Hank: Card Size

Hank: Card Size: My Card	
Columns	Rows

Use the Card Size card to find out how big a Fact Card is. Give the name of the Fact Card in the title, for example, to look in the card "Upon", use "Hank: Card Size: Upon". Hank will then look for this Fact card, and match the Columns and Rows values with the number of columns and rows in the Fact Card, returning any variables in these parameters. If the match fails, the status will be set to Fail.

Hank: Copy

Hank: Copy	
From	To

Use the Copy card to put a value into a value box. The Copy card has two columns, and puts the value in the From column into the value box in the To column. (Hank doesn't care which order the columns are in, it looks for the columns by name.)

Hank: Decrement

Hank: Decrement	
Variable	Amount

Use the Increment card to subtract an amount from a variable, which should already contain a number. Put the variable in the first column, and the amount you want to subtract from it in the second column, and Hank will subtract the amount from the variable.

Hank: Divide

Hank: Divide		
Value 1	Value 2	Result

Use the Divide card to divide one number by another. If you put the numbers you want to divide into the first two columns, and an empty value box in the third, Hank will divide the first by the second and put the answer into the empty value box.

Hank: Exit

Hank: Exit
Status

Use the Exit card if you want to tell Hank to stop work on an Instruction Card. The Exit card also expects a value, which Hank puts into the status when ending the Instruction Card.

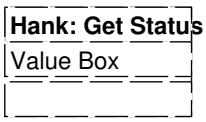
Hank: Get Cell Value

Hank: Get Cell Value: My Card		
Column	Row	Result

Use the Get Cell Value card to get the value from a Fact Card's cell. Give the name of the Fact Card in the title, for example, to look in the card "Upon", use "Hank: Get Cell Value: Upon". Hank will then look for this Fact Card, find the given column and row, and put the value it finds into the (empty) value box,

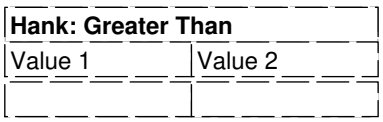
Result. If Hank couldn't get the cell for some reason, the status will be set to Fail.

Hank: Get Status



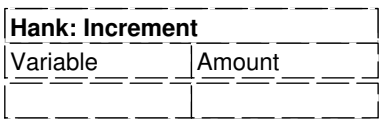
Use the Get Status card if you want to find the current status value. If you give it an empty value box, Hank will put the current status into the box.

Hank: Greater Than



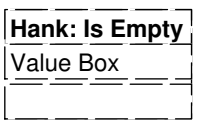
Use the Greater Than card to test to see if one number is greater than another. If the value in the first column is greater than the value in the second column, Hank will set the status to OK, and otherwise the status will be set to Fail.

Hank: Increment



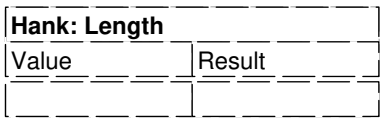
Use the Increment card to add an amount to a variable, which should already contain a number. Put the variable in the first column, and the amount you want to add to it in the second column, and Hank will add the amount to the variable.

Hank: Is Empty



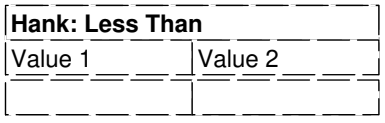
Use the Is Empty card to ask Hank whether a given value box is empty or not. The status will be set to OK if the value box is empty, otherwise it will be set to Fail.

Hank: Length



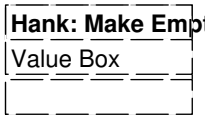
Use the Length card to find out how many elements there are in a composite value. Hank will put the length of the value in the first column into the empty variable in the second column. The status is always set to OK.

Hank: Less Than



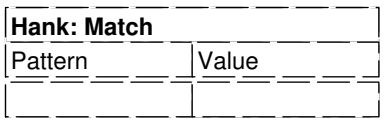
Use the Less Than card to test to see if one number is less than another. If the value in the first column is less than the value in the second column, Hank will set the status to OK, and otherwise the status will be set to Fail.

Hank: Make Empty



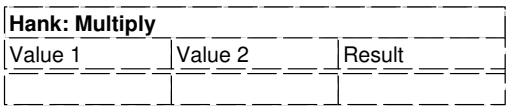
Use the Make Empty card to tell Hank to throw away the contents of a given value box.

Hank: Match



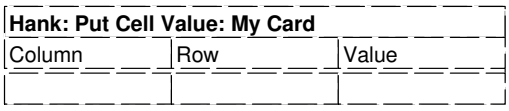
Use the Match card to match a pattern against a value. The Match card has two columns, and matches the pattern in the Pattern column with the value in the Value column. Variables in the pattern may acquire values, and the status is set to OK if the pattern matches, or Fail if it doesn't. (Hank doesn't care which order the columns are in, it looks for the columns by name.)

Hank: Multiply



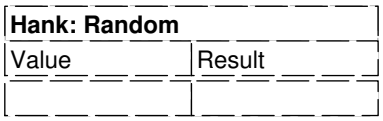
Use the Multiply card to multiply two numbers together. If you put the numbers you want to multiply into the first two columns, and an empty value box in the third, Hank will multiply the numbers and put the answer into the empty value box.

Hank: Put Cell Value



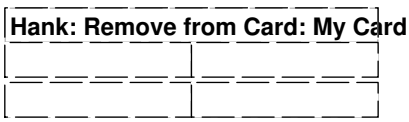
Use the Put Cell Value card to put a new value into a Fact Card's cell. Give the name of the Fact Card in the title, for example, to look in the card "Upon", use "Hank: Put Cell Value: Upon". Hank will then look for this Fact Card, find the given column and row, and put the value into the given cell. If Hank couldn't get the cell for some reason, the status will be set to Fail.

Hank: Random



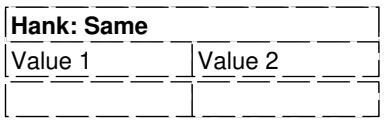
Use the Random card to give you a random number. The number returned will be a whole number between 1 and the number you put in the first column, Value, and it will be put into the variable in the second column, Result.

Hank: Remove from Card



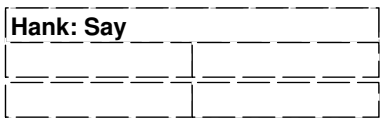
Use Remove from Card if you want to remove a row from a Fact Card. Give the name of the Fact Card in the title, for example, to remove from a card "Upon", use "Hank: Remove from Card: Upon". Hank will then look for this Fact Card, and will try to remove the given row. If a row is removed, Hank will set the status to OK, otherwise Fail.

Hank: Same



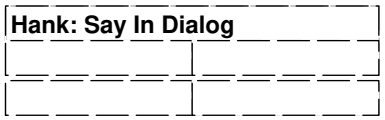
Use the Same card to find out if two values are the same. If they are the same, the status will be set to OK, otherwise it will be set to Fail.

Hank: Say



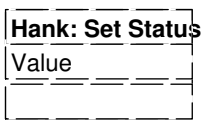
Use the Say card when you want Hank to print out some text. The Say card will take as many columns and values as you like, and then prints them all out in the Control Panel.

Hank: Say In Dialog



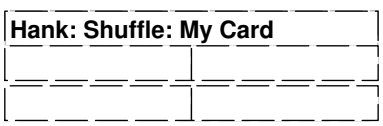
Use the Say In Dialog card when you want Hank to display a message in a dialog window. The Say In Dialog card will take as many columns and values as you like, and then prints them all out in the dialog box. The dialog will contain OK and Fail buttons, and the status will be set to the value corresponding to your selection.

Hank: Set Status



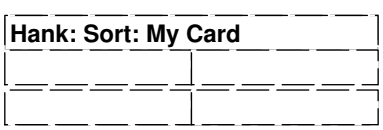
Use the Set Status card if you want to set the status to a new value. If you give it a value, Hank will put that value into the status.

Hank: Shuffle



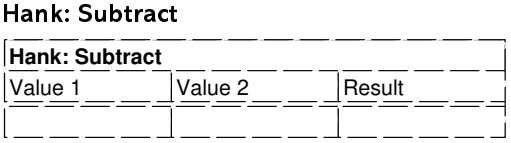
Use the Shuffle card to shuffle all the rows in a Fact Card. The Shuffle card doesn't need or use any of the columns or rows, and ignores them. The rows in the Fact Card are reordered, more or less at random.

Hank: Sort



Use the Sort card to sort all the rows in a Fact Card. The Sort card doesn't need or use any of the columns or rows, and ignores them. The rows in the Fact Card are simply sorted so that the alphabetically earlier items come first.

Hank: Subtract



Use the Subtract card to take one number from another. If you put the numbers you want to subtract into the first two columns, and an empty value box in the third, Hank will put the difference between them into the empty value box.

Chapter 5. Hank reference

This section has yet to be written. It will cover all the commands available through Hank's menus. Most of the commands that have not already been described are only of use to those using Hank for purposes other than cognitive modelling.

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