Legacy of advanced informatization

(Legacy of advanced informatization in Ljubljana as a sound basis for the future of digitalization in Slovenia)

The Computer History Museum, Ljubljana in co-organization with the Institute of Contemporary History, Ljubljana and Institute Jožef Stefan, Ljubljana is organizing an international expert panel "The Legacy of Advanced Informatization". The panel will take place on Monday June 13th 2022 from 14:00 - 18:00 and will feature participants from the fields of information technology, digital humanities, law, entrepreneurship and museum science. The one-day event will be held in person at the Computer History Museum in Ljubljana as a closed event for the group of expert panelists and select observers to present their papers and exchange insights. The key takeaways of this expert meeting will be published in an electronic publication.

The goal of the expert panel presentations is to contribute to the understanding of software heritage and continuity challenges as well as help us co-create the guidelines for the preservation of software legacy in Slovenia. In our mapping of the current state of affairs we detected a lack of emphasis on software heritage in key strategic documents of public policies and museum practices in the field of heritage preservation and were faced with the following questions: Which software heritage will we leave for future generations in Slovenia? How to properly preserve software? What are the challenges in the musealization of software? What legal issues can we encounter?, etc.

The event is supported by the City of Ljubljana (Mestna občina Ljubljana) and the French Cultural Institute in Slovenia (Institut français de Slovénie).

Symposium Agenda 13.6. 2022:

14:00 - 14:20 Arrival and greetings - Gaja Zornada (Head of Computer History Museum)

14:20 - 14:40 Roberto Di Cosmo, PhD (UNESCO Software Heritage), Keynote on Software Heritage

---

14:40 - 15:00 Borut Kumperščak, MSc (Computer History Museum, Interactive Preservation Department), Bit shovels and similar artifacts

Abstract:

Today's software is typically a very complex array of code, structure and dependencies, machine code, programming environment, hardware, data input and output sets and backend support system, systems for version tracking, tools for continuous integration and introduction, tools for functional planning and bug tracking, etc. Software development is practically a never ending process . At the same time software represents a dynamic category, encompassing a vast array of engineering practices, collective knowledge management, and as such reflects the economic, legal and social imperatives of the environment in which it was created.

We are going to explore an example of software from the Computer History Museum collection. In this collection item the source code has been preserved but at the moment we do not have an appropriate environment to translate and run it. We will also look at a related situation where the input and output data of a software have been preserved, but the code itself is lost.

15:00 - 15:20 Saša Divjak, Phd (Professor Emeritus Faculty of Computer and Information Science), Development and obsolescence of programs - the programmer's challenge and nightmare

Abstract:

The contribution will touch upon the problems programmers and users of computer programs are presented with in the constant onslaught of newer and newer versions of programming languages, software libraries and development tools and platforms. A special problem in itself is the maintenance of software, which is losing support on the hardware and system software levels. The presentation will be spiced up with concrete examples. It will be based on the point of view of a programmer - developer as well as on the needs for ongoing upgrades, learning and teaching of programming languages and software development. It will span from experience with software development in the early 1970ies all the way to the challenges we face in today's connected world and mobile applications. We will conclude with a speculative thought on the future of programming.

15:20 - 15:40 **Silvana Žorž, MA (Digital Humanist),** Are values in software development time-critical or can they be stored?
Abstract:
The ethical quality of technology derives from the more or less explicit norms and values accepted by a social group or culture (Stahl, Timmermans & Mittelstadt, 2016, pp. 55-58). According to Friedman, value refers to what a person or group of people considers important in life. Although research has been conducted in the field of computer ethics for decades, there is no consensus on what the key components of computer ethics are (Stahl et al., 2016).
With the increasing use and deployment of computer technologies and artifacts, the need for an understanding of the ethical aspects of computing is increasing for professional computer scientists and related technical experts. The purpose of this paper is to investigate, using a reverse engineering approach, whether software can be analyzed retrospectively from the point of view of values.
Through interview, literature review, and an analysis of practices for incorporating the concept of values into the software development process, we attempt to answer the question of how difficult it is to identify and "store" values in order to preserve the historical context and norms from which the software in question emerged.

15:40 - 16:00 **Primož Jakopin, PhD (SAZU)**, From BESS to EVA, archival challenge
Abstract:
The preservation of past software and its legacy is an acute and very important issue, and the idea by SRM to tackle it also comes at a very opportune time. Several protagonists from the early time, seventies and eighties of the past century, are still with us. The most important aspect is the legacy, the problem solving ideas applied and contained in the programs of the past, the ideas which in many instances keep their relevance for the upcoming work.
After mentioning the first Slovenian software tool in wider use, STRUCTRAN, a FORTRAN preprocessor from 1975, the author outlines the condition of his contributions in software area, mainly for microcomputers, from BESS in 1982/83, over INES till STEVE (late 1980s) and EVA/NEVA in the nineties (EVA is still being updated). The author discusses feasibility of a wikipedia-like solution of how to present the software as an online museum exhibit, where the user interaction would not be limited only to general comments, but the users would also have an opportunity to contribute to the comment side of the particular source code, as well as to its examples of use.

16:00 - 16:20 coffee/tea break

16:20 - 16:40 **Andrej Pančur, PhD (Institute of Contemporary History)**, Open science and software heritage:
An example of research software storage in digital humanities
Abstract:
Open science includes not only open access to scientific papers and research data, but also open access to software resulting from the process of those research endeavors. In the new Horizon Europe EU research and innovation initiative compliance to open science principles is prescribed for scientific publications and research data, while it remains merely a recommendation for software itself. Despite this, the awareness of software preservation significance has been gaining a foothold in the scientific community over the past years. The author will present main initiatives and solutions in this area. Special attention will be given to the problem of storing results of digital humanism projects, where we need to pay holistic attention to digital storage of research results as well as in the context of digital editions also presentations, functionality and program code. This presents a big challenge especially for smaller digital humanism projects with limited financing, which does not allow for long term maintenance of technically demanding digital editions. The author will present certain solutions, developed at the Institute of Contemporary History, in the context of providing research infrastructure for Slovene historiography and research infrastructure for digital humanities.

16:40 - 17:00 **Nataša Milić-Frayling, PhD (Founder and CEO, Intact Digital Ltd, Professor Emerita, University of Nottingham)**, Towards sustained use of software for long-term access to digital heritage
Abstract:
Digital media is fundamentally computational. Without software, digitally encoded content cannot be interpreted, presented and experienced. However, the importance of software is often overlooked.

In regulated sectors, digital data must be retained for decades and software must remain functional for reconstruction of past studies and reproducibility of data analyses. This is a challenge due to rapid obsolescence of software. Similarly, authentic presentation of digital art requires special care, combining legacy software and contemporary technologies to enable the intended user experience of artistic works.
We aim for a systematic and principled approach to long-term care of software to ensure that digital content remains accessible for as long as needed. We developed a framework for assessing and mitigating risks associated with legacy software installations and promote development of economically sustainable services to enable digital continuity across public and industry sectors.

17:00 - 17:20 **Matija Šuklje (Senior IP Counsel Liferay)**, Legal challenges of archiving software
Abstract:
The archiving and public display of software in a museum can prove challenging, especially since copyright law does not cover software well at all, and for museastic purposes even less so. What further complicates the matter is that software is only rarely just code, but includes several other pieces that all may be covered by their own rights and obligations. In this talk we shall point out these challenges and, hopefully, provide some solutions.

17:20 - 17:40 **Boštjan Špetič (Computer History Museum, Head of Collections)**, Forever young
Abstract:
Head of Collections at the Computer History Museum will tell a romantic story of a computer forgotten and revived and a program lost and rediscovered. We will see a case study of how broad the challenges of software preservation can be, and how impactful this is when done right.

17:40 - 18:00 **Open discussion**

Expert panelists biographies:

Roberto Di Cosmo

Roberto di Cosmo is a computer scientist and in 2010 he was first director of IRILL, initiative for innovation and research of free and open software (La Recherche et l'Innovation sur le Logiciel Libre). After a decade of teaching at the Ecole Normale Supérieure in Paris, he became a tenured professor of computer science at University Paris Diderot in 1999. He is active in research in the field of theoretical computing, especially functional programming, parallel and distributed programs, programming language semantics, system types and linear logic. He now focuses on new scientific problems created by ubiquitous use of free and open source software, which was core to the European research project Mancoosi. He is monitoring the informational technology induced social changes with great interest and is a longtime proponent of free software, and contributed to its establishment with a bestseller The planetary holdup (Le Hold-Up planétaire, 1998). In 2007 he founded a thematic group for free programming at Systematic, which induces the creation of more than 60 open source research and development projects in the last decade. Di Cosmo was an early member of AFUL, the French Linux society. His most known contribution to Linux is the first live distribution of Linux (2000 to 2002), demolinux, which enabled running Linux from a CD-ROM. In 2015 he established and now leads Software Heritage, an initiative for creating a universal archive of all publically accessible source code.

Andrej Pančur

Andrej Pančur is Head of the infrastructure program Research Infrastructure for Slovene historiography, active in the field of digital humanistics and director of Institute of Contemporary History, Ljubljana. He obtained his PhD in 2002 at the History department of the University of Ljubljana Faculty of Arts, with the dissertation Monetary politics in the Habsburg monarchy and Slovene people (1848-1914). He obtained his Masters degree in 1999 at the History department of the University of Ljubljana Faculty of Arts with the topic Economic and social worldviews in the 1880s and 1890s in Slovenia. In 2000 he held a scholarship position at the Institute for European history (Institut für Europäische Geschichte) in Mainz germany. Since 1996 he is employed at the Institute of Contemporary History. Between 2002 and 2015 he was a member of the research program for economic and social history at the institute, and since 2022 a member of the new research program Digital Himanistics: sources, tools, frameworks and methods. He was a member of several research projects, among others he headed the project on Asset and civic-legal status of Jewish Slovenes in the 20th century. Since 2011 he works in Research infrastructure for Slovene historiography, where he is responsible for technological development, research data, digital editions and transfer of digital humanistics techniques and methods in the Slovene research space.

Primož Jakopin

Born June 30, 1949 in Ljubljana, Slovenia in a linguistic family - father Franc was a professor of eastern Slavic languages with publications in the field of grammar and onomastics, mother Gitica has translated more than 50 novels from English, German, French, Russian and Polish. Because his main extracurricular activity was caving he intended to study geology but followed his father's advice with a degree in mathematics at the University of Ljubljana in 1972. In 1981 he received a master's degree in information science: Entropy of Names and Family Names in Slovenia at the University of Zagreb, in 1999 a PhD in information theory: Upper Bound of Entropy in Slovenian Literary Texts at the University of Ljubljana. From 1972 to 1984 he constructed a numerical model for approximation and visualization of karst caves. It was used to compute the volume of several caves and collapsed dolinas in Slovenia; the results were reported at the 8th International congress of speleology and 3rd European symposium of stereology. After he failed to continue this research at the Karst Research Institute in Postojna he changed his area of interest to language technology, closer to the parental field of work. His great passion was also computer programming. With the software he developed mostly at home he managed to make a career in computational linguistics, both in research, as head of Corpus Laboratory at the Fran Ramovš Institute of Slovenian Language, since its foundation in 2001 till 2012, and in teaching, at the Faculty of Arts in Ljubljana (1993-2012) and at the School of humanities in Nova Gorica (2012-2016). Major pieces of software: STAT (statistical package, Control Data Cyber, 1977), IBIS (software package for data of variable length, mainly used for handling secondary library information such as data on books and articles, Digital DEC 10, 1981), INES (text editor with database and graphics, Sinclair ZX Spectrum, 1985, widely used in ex-Yugoslavia), STEVE (16-bit character text editor with database, graphics and DTP, ATARI ST, 1987-1992, distributed in ex-Yugoslavia, Germany, Benelux and Norway, manuals in English, German, Slovenian and Serbian/Croatian), EVA (text editor with database and language technology features, 135.000 lines of code in C, for DOS, 1992 and Windows operating system, 1996-), NEVA (EVA-based search engine for Windows servers, 1999-).

Matija Šuklje

Legal Counsel by education, a hacker at heart, Matija Šuklje feels most at home at the crossing of both those worlds. Since the late 1990s he has dedicated his skills to FOSS (Free & Open Source Software) and collected a vast array of experience in the field both in public, NGO and private sector. He spent years leading the largest global network of legal experts, specialized in open-source topics, where he is still an active member. He currently holds the position of Senior IP Counsel at Liferay.

Borut Kumperščak

Borut Kumperščak leads the Computer History Museum's Interactive Preservation Department. Borut is a creative engineer and entrepreneur in the fields of computer graphics, interactive experiences, VR and XR, health and environmental sensorics as well as machine learning. He is currently working in the Laboratory for data technologies at the University of Ljubljana Faculty of Computer Science, where he is actively contributing to expanding use of Slovene language in digital environments. He is a cofounder and CTO of UNIKI, Ambassador of Software Heritage. He won 1st prize at the 2019 BR4IN.IO Brain-Computer User Interface Designers' Hackathon within the Popcorn vs. Unicorn project, Trbovlje and a prize for the project Phenakistomixer in the annual Cocktail Robot Awards v15.0 for Cocktail Culture.

Boštjan Špetič

Boštjan Špetič is Head of Museum Collections at the Computer History Museum, Software Heritage Ambasador, entrepreneur and startup mentor, currently living in Slovenia, but keeping tight connections with New York, where he lived for most of the past decade. Boštjan Špetič co-founded, built and sold two products within the same startup Zemanta. First was a personal assistant based on semantic web technologies, which was acquired by an independent publishing-technology company Sovrn, the other product was the first programmatic advertising platform (DSP), specialized for native advertising and got acquired by Outbrain. Boštjan currently works in Outbrain's development group as a product specialist, is a mentor to several entrepreneurs worldwide, and a board member of Rock Content.

Saša Divjak

Saša Divjak is the author of various program applications, lead and collaborator on a series of international and local projects in the field of computer automatization, robotization and multimedia technologies. He was active on boards of various international and local professional associations. He was head of the Department of electrotechnics at the Institute Jožef Stefan, assistant to CEO of Iskra Delta, Dean of Faculty for computer science and informatics at the University of Ljubljana, and Director of Laboratory for computer graphics and multimedia. He held the lecturer position for subjects Programming 2, System software, Operating systems, Computer graphics.

Silvana Žorž

Silvana Žorž, Master of Digital Humanities (KU Leuven) and Master of Economics (Master in Business and Administration - IBM, University of Ljubljana). In her master's thesis, she researched the discovery of discriminatory factors in software design, under the mentorship of dr. B. Berendt (KU Leuven, Belgium). Her master's thesis with cum laude, and dedicated her work to the value system in software design methodology. She has collaborated with many companies (Google, Outfit7 ...) in the field of digital marketing, digital product development, market research and consumer habits. She is currently a senior advertiser with the digital agency Red Orbit.

Nataša Milić-Frayling

Dr Nataša Milić-Frayling is a Founder and CEO of Intact Digital Ltd, a company that provides a platform and services for hosting legacy software installations to enable long-term readability and use of digital data. Intact Digital works with highly regulated sectors such as Pharma and Life Sciences to support compliance with the data integrity regulations, reconstruction of research studies and reproducibility of data analyses, including machine learning and AI.

Nataša has 25 years of experience in computer science research and innovation, including 17 years at Microsoft Research (MSR). She authored over 100 research publications and has dozens of approved patents to her name. Besides her research, Natasa led MSR Research Partnership Programme, promoting collaboration with innovation partners on strategic challenges, including digital preservation and long term access to digital content (PLANETS and SCAPE EU projects). She is Professor Emerita at the University of Nottingham where she spent 5 years serving as Chair of Data Science, contributing to the University research strategy on Data Science and AI.

Nataša is actively engaged with a broader professional community on critical issues that arise from the prolific use of digital technologies, ranging from professional ethics, privacy and design transparency to digital obsolescence and responsible innovation. She is a member of the Preservation Sub-Committee within the UNESCO Memory of the World Programme and serves as Chair of the Research and Technology Working group for the UNESCO PERSIST project. Nataša is an active member of the Association for Computing Machinery (ACM). She served on the ACM Europe Council and as Chair of the ACM Women Europe Executive Committee.

SLO

Zapuščina napredne informatizacije

(Zapuščina napredne informatizacije mesta Ljubljane kot popotnica za prihodnost razvoja digitalizacije na Slovenskem)

Računalniški muzej v Ljubljani skupaj s soorganizatorjema Inštitutom za novejšo zgodovino in Inštitutom Jožef Stefan organizira mednarodni strokovni posvet **Zapuščina napredne informatizacije**. Posvet se bo odvil v ponedeljek, 13. 6. 2022, med 14. in 18. uro z vabljenimi udeleženci s področja informacijske tehnologije, digitalne humanistike, prava, podjetništva in muzejskih znanosti. Enodnevni dogodek bo potekal v živo v Računalniškem muzeju v Ljubljani kot zaprti dogodek za predstavitev strokovnih prispevkov in izmenjavo mnenj med govorci ter izbranimi vabljenimi strokovnjaki. Ključna spoznanja s posveta bomo naknadno objavili v elektronski publikaciji.

Cilj posveta je prispevati k razumevanju softverske dediščine in izzivov pri zagotavljanju kontinuitete ter sooblikovanje smernic za hrambo softverske dediščine v Sloveniji. V ključnih strateških dokumentih javnih politik in muzejskih praksah za področje dediščine smo namreč zaznali izostanek v obravnavi softverske dediščine in se soočili z naslednjimi vprašanji: Katero softversko dediščino bomo v Sloveniji pustili zanamcem?, Kako primerno hranimo programsko opremo?, Kakšni so izzivi pri muzealizaciji?, Na katere pravne izzive lahko naletimo?, itd.

Dogodek sta podprla Mestna občina Ljubljana in Francoski inštitut v Sloveniji.

Urnik 13.6. 2022:

14:00 - 14:20	prihod in pozdrav - Gaja Zornada (Računalniški muzej)
14:20 - 14:40	**dr. Roberto Di Cosmo (UNESCO Software Heritage Foundation)**, Uvodno predavanje o softverski dediščini

---

14:40 - 15:00	**mag. Borut Kumperščak (Računalniški muzej, Oddelek za interaktivno preservacijo)**, Bitne lopate in drugi artefakti Povzetek: Današnje programje je tipično zelo kompleksen sestav izvorne kode, ogrodij in odvisnosti, strojne kode, programskega okolja, strojne opreme, vhodne in izhodne podatkovne množice, ter seveda zalednega podpornega sistema, sistemov za vodenje različic, orodij za kontinuirano inegracijo in uvajanje, orodij za načrtovanje funkcionalnosti in sledenje hroščem, itd. Razvoj praktično nikoli ni dokončan. Hkrati je softver dinamična kategorija, ki obsega sofisticirane inženirske prakse, upravljanje s kolektivnim znanjem, ter odseva poslovne, pravne in družbene prakse okolja in časa, v katerem je nastal. Iz zbirke Računalniškega muzeja si bomo pogledali primer softvera, pri katerem je ohranjena izvorna koda, a zaenkrat nimamo ohranjenega primernega okolja, na katerem bi jo lahko prevedli in pognali, ter soroden primer, pri katerem so ohranjeni izhodni podatki, poznamo tudi ustrezne vhodne podatke, a sama koda je izgubljena.
15:00 - 15:20	**dr. Saša Divjak (profesor Emeritus Fakulteta za računalništvo in informatiko)**, Razvoj in zastaranje programov - Izziv in nočna mora programerjev Povzetek: Prispevek bo obravnaval probleme, ki jih programerjem in uporabnikom programov predstavlja nenehno pojavljanje novih in novih različic programskih jezikov, programskih knjižnic in razvijalskih orodij ter platform. Poseben problem je tudi vzdrževanje programov, ki sčasoma izgubljajo podporo tako v aparaturni kot v sistemski programski opremi. Predstavitev bo začinjena s konkretnimi primeri. Temeljila bo na pogledih programerja-razvijalca kot tudi na potrebah po nenehnem posodabljanju učenja in poučevanja programskih jezikov in programiranja. Posegala bo v izkušnje z razvojem programov v zgodnjih 70 letih prejšnjega stoletja vse do problematike, s katero se srečamo v sodobnem povezanem svetu in z mobilnimi aplikacijami. Na koncu bo podano še špekulativno razmišljanje o prihodnosti programiranja.
15:20 - 15:40	**mag. Silvana Žorž (Digitalna humanistka)**, So vrednote v razvoju programja časovno občutljive ali jih lahko shranimo? Povzetek: Etični vidiki tehnologije izvirajo iz bolj ali manj eksplicitnih družbenih norm in vrednost kot jih je sprejelo določeno družbeno okolje ali kultura (Stahl, Timmermans & Mittelstadt, 2016, pp. 55-58). Po Friedmanu, vrednote zaobjemajo, kaj oseba ali skupina ljudi obravnavajo kot pomembno v življenju. Čeprav se že desetletja opravljajo

raziskave na področju računalniške etike, nimamo konsenza okrog glavnih elementov, ki računalniško etiko definirajo (Stahl et al., 2016).
Z razširjanjem prisotnosti in uporabe računalniške tehnologije se povečuje potreba po razumevanju etičnih vidikov računalništva med računalničarji in drugimi tehničnimi strokovnjaki. Ta prispevek bo z metodo obratnega inženirstva raziskal ali lahko retrospektivno analiziramo računalniško programje z vidika vrednostnih sistemov. Skozi intervjujev, pregled literature in analizo praktičnih postopkov za vključevanje koncepta vrednost v razvoj programske opreme, bomo poskusili odgovoriti na vprašanje, kako težko je prepoznati in "shraniti" vrednote, da ohranimo zgodovinski kontekst in norme, iz katerih je obravnavani softver izšel.

15:40 - 16:00 **dr. Primož Jakopin (SAZU)**, Od BESS do EVA, Arhivski izziv
Povzetek:
Ohranjanje preteklega programja in njegove dediščine je akutna in pomembna problematika in ideja Računalniškega muzeja, da se z njo spoprime, prihaja ob primernem času. Nekaj zgodnjih protagonistov iz sedemdesetih in osemdesetih let prejšnjega stoletja je še vedno z nami. Najpomembnejši vidik zapuščine je problemsko razmišljanje, ki je bilo uporabljeno in zaobjeto v programih iz preteklosti, ideje, ki so v veliko primerih ohranile relevantnost za prihodnje delo.
Po omembi prvega slovenskega računalniškega programskega orodja v širši rabi STRUCTRAN, predobdelovalnika kode FORTRAN iz leta 1975, avtor oriše svoj prispevek na področju programja predvsem za mikroračunalnike, od BESS v letih 1982/83, preko INES do STEVE (pozna 1980ta) ter EVA/NEVA v devetdesetih (EVA se še vedno posodablja).
Avtor razpravlja o izvedljivosti rešitve, podobne Wikipediji za predstavitev programja kot spletne muzejske razstave, kjer uporabnikova interakcija ne bi bila omejena le na splošne komentarje, temveč bi uporabniki lahko prispevali poleg primerov uporabe tudi k vsebini določene programske kode.

16:00 - 16:20 odmor za kavo / čaj

16:20 - 16:40 **dr. Andrej Pančur (Inštitut za novejšo zgodovino)**, Odprta znanost in softverska dediščina: primer hrambe programske opreme v raziskavah digitalne humanistike
Povzetek: Odprta znanost ne zajema zgolj odprtega dostopa do znanstvenih objav in raziskovalnih podatkov, temveč tudi do programske opreme, ki je nastala kot rezultat raziskav. Če se bodo morali v novem okvirnem programu EU za raziskave in inovacije Obzorje Evropa v primeru znanstvenih objav in raziskovalnih podatkov raziskovalci brez izjem držati načel odprte znanosti, je pri programski opremi v raziskavah to še vedno le priporočilo. Kljub temu pa se v raziskovalni skupnosti zavedanje o pomenu hrambe programske opreme v raziskavah v zadnjih letih vedno bolj utrjuje. Avtor bo predstavil glavne pobude in rešitve na tem področju. Posebno pozornost bo namenil problemu hrambe rezultatov digitalno humanističnih projektov, pri katerih je potrebno poskrbeti za čim bolj celovito digitalno hrambo ne le raziskovalnih podatkov, temveč v okviru delujočih digitalnih izdaj tudi prezentacij, funkcionalnosti in programske kode. To je velik izziv predvsem za manjše digitalno humanistične projekte z omejenim financiranjem, ki ne omogoča dolgoročnega vzdrževanja tehnično zahtevnih digitalnih izdaj. Kot alternativna rešitev se ponujajo rešitve, ki jih v zadnjih letih ponuja hiter razvoj statičnih spletnih strani. Avtor bo tako predstavil nekatere rešitve, ki so jih razvili na Inštitutu za novejšo zgodovino v okviru izvajanja raziskovalne infrastrukture slovenskega zgodovinopisja in raziskovalne infrastrukture za digitalno humanistiko.

16:40 - 17:00 **dr. Nataša Milić-Frayling (ustanoviteljica in direktorica Intact Digital Ltd, profesorica Emerita, University of Nottingham)**, Trajnostna raba programja za dolgoročni dostop do digitalne dediščine
Povzetek:
Osnova digitalnih medijev je računalniška. Brez računalniškega programja se digitalno enkodirane vsebine ne da interpretirati, predstaviti in izkusiti. Vendar pa je pomembnost računalniškega programja pogosto spregledana. V reguliranih okoljih se morajo digitalni podatki hraniti desetletja in programi morajo ohraniti funkcionalnost za rekonstrukcijo preteklih študij in poustvaritev podatkovnih analiz. To predstavlja velik izziv zaradi hitrega zastaranja programske opreme. Podobno zahteva avtentična predstavitev vsebin posebno obravnavo, ker združuje podedovano programje in sodobne tehnologije, da omogoči želeno uporabniško izkušnjo umetniških del. Prizadevamo si za sistematičen in načelen pristop k dolgotrajni obravnavi programja, da bi zagotovili dostopnost digitalnih vsebin dokler se bodo potrebovale. Razvili smo ogrodje za oceno in preprečevanje rizikov povezanih z

inštalacijami zapuščinskega programja in se zavzemamo za razvoj ekonomsko trajnostnih rešitev za opolnomočenje digitalni skupnosti različnih javnost in industrijskih sektorjev.

17:00 - 17:20 **Matija Šuklje (Višji pravnik, Liferay)**, Pravni izzivi hrambe programske opreme
Povzetek: Arhiviranje in priobčevanje javnosti računalniških programov je za muzej lahko velik izziv. Še posebej, ker avtorsko pravo ne pokriva dobro programske opreme, še manj pa z muzeastičnega vidika. Kar dodatno zakomplicira tematiko, je dejstvo, da je programska oprema le redko samo koda, ampak je pogosto sestavljena iz različnih komponent, za katere veljajo različne pravice in obveznosti. V tem predavanju se bomo dotaknili teh izzivov ter, upamo, tudi rešitev.

17:20 - 17:40 **Boštjan Špetič (Računalniški muzej, Vodja kustodiata)**, Večno mlad
Povzetek: Vodja muzejske zbirke v računalniškem muzeju nas popelje na romantično pot zgodbe o pozabljenem računalniku in računalniškem programu, ki je bil izgubljen, a ponovno najden. Ogledali si bomo praktični primer, ki bo ilustriral širok nabor izzivov pri ohranjanju programja in programske dediščine ter naslovili pomembnost in učinek pravilno izvedene in predstavljene rekonstrukcije.

17:40 - 18:00 **Razprava**

Biografije

Roberto Di Cosmo

dr. Roberto di Cosmo, Software Heritage, je računalniški znanstvenik in prvi direktor IRILL, pobude za inovacije in raziskave proste programske opreme (La Recherche et l'Innovation sur le Logiciel Libre). Po skoraj skoraj desetletju poučevanja na Ecole Normale Supérieure v Parizu je Roberto leta 1999 postal redni profesor računalništva na Univerzi Paris Diderot. Aktivno se ukvarja z raziskavami na področju teoretičnega računalništva, zlasti funkcionalnega programiranja, vzporednega in porazdeljenega programiranja, semantike programskih jezikov, sistemov tipov, prepisovanja in linearne logike. Zdaj se osredotoča predvsem na nove znanstvene probleme, ki jih je prinesla splošna uveljavitev proste programske opreme, s posebnim poudarkom na statični analizi velikih zbirk programske opreme, ki so bili jedro evropskega raziskovalnega projekta Mancoosi. Z velikim zanimanjem spremlja razvoj naše družbe pod vplivom informacijske tehnologije in je dolgoletni zagovornik proste programske opreme, saj je od leta 1998 prispeval k njeni uveljavitvi s knjižno uspešnico 'Ugrabitev sveta'. Oktobra 2007 je ustanovil tematsko skupino za prosto programsko opremo pri podjetju Systematic, ki je v zadnjih desetih letih spodbudila nastanek več kot 60 odprtokodnih raziskovalnih in razvojnih projektov. Di Cosmo je bil zgodnji član AFUL, združenja francoske skupnosti uporabnikov Linuxa in proste programske opreme, znan pa je tudi po svoji podpori gibanju za odprtokodno programsko opremo. Njegov najbolj znan prispevek k Linuxu je prva "živa" distribucija Linuxa (2000 do 2002), demolinux, ki je omogočila zagon Linuxa s CD-ROM-a brez namestitve celotne distribucije. Leta 2015 je ustanovil in zdaj vodi Software Heritage, pobudo za vzpostavitev univerzalnega arhiva vse javno dostopne izvorne kode.

Andrej Pančur

Andrej Pančur, vodja Infrastrukturnega programa Raziskovalna infrastruktura slovenskega zgodovinopisja, dejaven na področju digitalne humanistike in direktor Inštituta za novejšo zgodovino, Ljubljana. Doktoriral leta 2002 na Oddelku za zgodovino Filozofske fakulteta Univerze v Ljubljani z disertacijo Monetarna politika v habsburški monarhiji in Slovenci (1848-1914). Magistriral leta 1999 na Oddelku za zgodovino Filozofske fakulteta Univerze v Ljubljani s temo Gospodarski in socialni nazori v 80. in 90. letih 19. stoletja na Slovenskem. Leta 2000 je bil štipendist na Inštitutu za evropsko zgodovino (Institut für Europäische Geschichte) v Mainzu v Nemčiji. Od leta 1996 je zaposlen na Inštitutu za novejšo zgodovino. Med leti 2002 do 2015 je bil na inštitutu član raziskovalnega programa za gospodarsko in socialno zgodovino, od leta 2022 je član novega raziskovalnega programa Digitalna humanistika: viri, orodja in metode. Bil je član večih raziskovalnih projektov, mdr. je vodil projekt Premoženjski in civilno-pravni položaj slovenskih Judov v 20. stoletju. Od leta 2011 deluje v Raziskovalni infrastrukturi slovenskega zgodovinopisja, kjer je odgovoren za tehnološki razvoj, raziskovalne podatke, digitalne izdaje ter prenos digitalnih humanističnih tehnik in metod v slovenski raziskovalni prostor.

Primož Jakopin

Primož Jakopin je že v študentskih letih odkril željo po pisanju računalniških programov. Napisal je urejevalnik besedil Ines, po katerem je ljubljansko podjetje Tipro takrat poimenovalo čisto pravo slovensko tipkovnico. V svoji karieri je napisal IBIS (Integralni bolnišnični informacijski sistem), BIOS (BioMedicina Slovenica), urejevalnike BESS (Basic Editor for the Sinclair Spectrum, 1983), TESS (Text Editor for the Sinclair Spectrum, 1983), INES (INformation Editing System, 1983), EVE (EVent Editor, 1986) in STEVE (ST EVent Editor for Atari ST, 1986). Njegovo znanstveno in pedagoško delo je predvsem s področja korpusnega jezikoslovja. Povezano je po eni strani z gradnjo in uporabo besedilnega korpusa Nova beseda, po drugi pa s pripravo in spletno uporabo slovarskih del. Vodil je digitalizacijo Slovarja slovenskega knjižnega jezika ter zbranih del Ivana Cankarja, Cirila Kosmača in Draga Jančarja. Napisal je več računalniških orodij za

pripravo in uporabo besedilnih in slovarskih podatkovnih zbirk, znana sta urejevalnik EVA in spletni iskalnik NEVA. Od leta 1993 do 2001 je bil zaposlen na Filozofski fakulteti kot asistent, po letu 2001 dopolnilno kot docent na področju jezikovnih tehnologij. Na Oddelku za primerjalno in splošno jezikoslovje predava predmeta Jezikovne in spletne tehnologije in Računalniška analiza besedil, sodeluje pri podiplomskem študiju. Od leta 1989 do 1996 je pogodbeno sodeloval z Inštitutom za slovenski jezik Frana Ramovša ZRC SAZU, od 1996 do 2001 je bil tam dopolnilno zaposlen, od leta 2001 pa s polnim delovnim časom kot vodja Laboratorija za korpus slovenskega jezika.

Matija Šuklje

Pravnik po izobrazbi in heker po duši, Matija Šuklje se najbolje počuti na stičišču obeh svetov. Od poznih 90. naprej se ukvarja s FOSS (Free & Open Source Software) in ima izkušnje na to temo tako v javnem, nevladnem ter gospodarskem sektorju. Dolga leta je vodil največjo globalno mrežo pravnikov, ki se specializirajo z odprto-kodne tematike, katere aktivni član je še vedno. Trenutno je Senior IP Counsel v mednarodnem podjetju Liferay.

Borut Kumperščak

Borut Kumperščak vodi Oddelek za interaktivno perzervacijo Računalniškega muzeja, je ustvarjalec, kreativni inženir in podjetnik na področjih računalniške grafike, interaktivnih izkušenj, virtualne in razširjene resničnosti, zdravstvene in okoljske senzorike, ter strojnega učenja. Trenutno dela v Laboratoriju za podatkovne tehnologije na Fakulteti za računalništvo UL, kjer si prizadeva razširiti uporabo Slovenščine v digitalnih okoljih. Je soustanovitelj in tehnološki direktor podjetja UNIKI, ambasador softverske dediščine pri Software Heritage. Leta 2019 je osvojil 1. Mesto na dogodku BR4IN.IO Brain-Computer User Interface Designers' Hackatonu, projekt Popcorn vs. Unicorn, Trbovlje in nagrado za projekt Phenakistomixer v okviru letnega Cocktail Robot Awards v15.0 for Cocktail Culture.

Boštjan Špetič

Boštjan Špetič je Vodja muzejske zbirke Računalniškega muzeja, ambasador softverske dediščine pri Software Heritage, podjetnik in mentor startupov, ki trenutno živi v Sloveniji, vendar je tesno povezan z New Yorkom, kjer je živel večino zadnjega desetletja. Boštjan Špetič je soustanovil, zgradil in prodal dva izdelka v okviru istega zagonskega podjetja Zemanta. Prvi je osebni pomočnik, ki je temeljil na semantičnem spletu in je bil prodan neodvisnemu založniško-tehnološkemu podjetju Sovrn, drugi pa prva programatična oglaševalska platforma (DSP), specializirana za nativno oglaševanje, ki je bila prodana podjetju Outbrain. Špetič trenutno dela v skupini za razvoj podjetja Outbrain kot produktni specialist, je mentor več podjetnikom, član upravnega odbora podjetja Rock Content in vodi Računalniški muzej.

Silvana Žorž

Silvana Žorž, magistra digitalne humanistike (KU Leuven) in magistra ekonomije (Master in Business and Administration - IBM, Univerza v Ljubljani). V magistrskem delu je raziskovala odkrivanje diskriminatornih faktorjev pri oblikovanju programske opreme, in sicer pod mentorstvom dr. B. Berendt (KU Leuven, Belgija). Magistrsko delo je opravila s cum laude, svoje delo pa posvetila vrednostnemu sistemu v oblikovalski metodologiji programske opreme. Sodelovala je s številnimi podjetji (Google, Outfit7...) na področju digitalnega marketinga, razvoja digitalnih produktov, raziskovanju trga in potrošniških navad. Trenutno je zaposlena pri digitalni agenciji Red Orbit.

Nataša Milić-Frayling

Nataša Milić-Frayling je ustanoviteljica in direktorica podjetja Intact Digital, ki nudi platformo in storitve za gostovanje podedovanih programskih namestitev z namenom omogočanja dolgotrajne berljivosti in uporabe digitalnih podatkov. Intact Digital posluje z visoko reguliranimi sektorji kot sta farmacevtska industrija in naravoslovna znanost, kjer nudi podporo pri doseganju skladnosti s predpisi za regulacijo podatkovne integritete, rekonstrukciji raziskav in ponovljivosti podatkovne analize, vključno s strojnim učenjem in umetno inteligenco.

Nataša ima 25 let izkušenj v računalniški znanost in inovacijah, vključno s 17 leti izkušenj v Microsoft Research (MSR). Je avtorica preko 100 raziskovalnih objav in je navedena na ducatih odobrenih patentov. Poleg raziskav je Nataša pri MSR vodila raziskovalno partnerski program, kjer je promovirala sodelovanje z inovacijskimi partnerji na stratešikih izzivih, vključno z digitalno perzervacijo in dolgotrajnim dostopom do digitalnih vsebin (EU projekta PLANETS in SCAPE). Je profesorica emerita na Univerzi v Nottinghamu, kjer

je 5 let vodila oddelek a podatkovne znanosti, prispevala k univerzitetnim raziskovalnim strategijam na področju podatkovnih znanosti in umetne inteligence.

Nataša se v širšem strokovnem krogu aktivno angažira ob kritičnih vprašanjih, ki se porajajo ob razširjeni rabi digitalne tehnologije od profesionalne etike, zasebnosti in jasnosti zasnove ter digitalne zastarelosti in odgovornega inoviranja. Je članica preservacijskega pod-komiteja v UNESCO Memory of the World Programme in predseduje delovni skupini za raziskave in tehnologijo pri projektu UNESCO PERSIST. Nataša je aktivna članica Association for Computing Machinery (ACM). Bila je svetnica v ACM Europe Council in predsedovala ACM Women Europe Executive komiteju.